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PREFACE

Prefatory words are scarcely necessary for the lectures contained in the present volume. They follow the course adopted in all previous years. These lectures bring the best thought of some of the most distinguished teachers in the teaching staff of the University of Pennsylvania. It is a pleasure to lay them before the friends of the University.

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THE FACTORS IN EPIDEMICS

By Alexander C. Abbott

Pepper Professor of Hygiene and Bacteriology, and Director of the Laboratory of Hygiene

Since the pandemic of Influenza of last year, I have been asked so frequently questions bearing on various phases of the outbreak that I thought we might profitably consider this afternoon, the subject of Epidemics and Pandemics in general, and discuss those particular features of such outbreaks as may give an idea of the important factors concerned in the spread, and in the prevention of disease.

In the first place there are terms employed that it may be well to define before beginning our discussion. The term "pandemic" refers to a world-wide spread of any particular disease. The term "epidemic" refers to a spread of a disease, not necessarily beyond the confines of a country or even a circumscribed community—but still a spread that is numerically so much greater than is customary to the place under consideration as to call for action and unusual effort at suppression; while the term "endemic" refers to the continuous presence of diseases of a transmissible character, among the population of a place. Thus we speak of typhoid and malarial fevers as endemic in those localities that are rarely free from a few cases of them. If in such places there be an advent of conditions favorable to a quick, sharp multiplication of the number of cases of those fevers, we say the disease has become epidemic.

Diseases that become pandemic are rare, exotic and are often disseminated in ways not at first glance evident. It is this that accounts for the delay in checking their spread.

Among the many questions that have been asked since the Influenza Pandemic are some that relate specifically to that disease, and others having a more general bearing.

Taking up the former group we find a common question to be: Is "The Flu," as it is sometimes called, a new disease? In the light of available knowledge that question may be answered in the negative. Though its manifestations differed in certain particulars from the influenza that was pandemic in the fall and winter of 1889–90, it is in all human probability the same disease.

In 1889–90 the fatalities were more often among persons beyond middle age, while in the outbreak of last year, this was not the case, a conspicuous number of the young and vigorous having been victims. But it must be remembered that during last year the young and vigorous of a large part of the male population were under unusual environment—that is, they were living under the intimate relations of camp life and this probably not only accounted in part for the rapid spread but also, by reason of reduced vitality incident to an unusual mode of life, for the fatalities among adolescent males.

Again in other respects, *i.e.*, pathologically and bacteriologically, the outbreak of last year seems to differ in particular ways from that of thirty years ago; I say "seems," for that appears to me to be the best way to put it when we consider that at the present day our methods of pathologic and bacteriologic investigation are so much more enlightening than they were a quarter of a century ago that we have a greater amount of more important data on last year's outbreak than on that which preceded it.

Another frequent question is: What was the cause of the outbreak? Many will probably differ with me when I say I do not believe that question can be answered finally at this time. It is true that in all the cases that were subject to competent examination there were found factors in common, just as was the case in the examinations made in 1889–90, and in both instances they were identical, but at this time the studies were so much more extensive and elaborate than formerly, that much more information has been obtained. Without entering into tiresome details this may be comprehended by the statement that in the majority of cases examined the same

microorganism, "bacillus influenzæ," found in 1889–90 was present in last year's cases, but it was often associated with or soon supplanted by other organisms that accounted for many of the most important pathological lesions. Also, that in an appreciable group of cases examined by certain investigators, there is said to have been demonstrated the presence of other organisms, not necessarily bacteria, that were so small as to pass through the pores of a porcelain filter and that did not possess any of the common characteristics of "bacillus influenzæ", or of any other bacterial species. This "filterable virus," as it is called, is believed by those investigators to be the real cause of influenza and the bacteria commonly found to be only associated with it. As said, I do not think a final opinion justified at this time.

The rapid spread of the disease; its appearance simultaneously in far distant places; its sudden occurrence in isolated localities have led, as in 1889–90, to numerous more or less absurd suggestions as to its mode of spread. As in 1889–90 the spread of the disease was along routes of travel and is attributable to human contact, and not to mysterious, occult influences; not to the air, and probably not to any great extent to lifeless objects that have been in contact with influenza patients. This may not seem a satisfactory explanation when we review superficially the way the disease appeared in various localities. It did not in 1889–90, when it was offered as an explanation. But later, when the centers of the disease were charted and their occurrence noted in order of exact chronology, it was soon evident that the spread was along lines of transportation by human agents and that the speed of transportation would readily account for the early successive dates of occurrence in remote places.

Another phase of the subject that must not be lost sight of in this connection is the role of the so called "human carrier." This is one of the most important elements in all epidemic and pandemic spreads of disease. We now know that in times of epidemic not all those contracting the disease are so affected as to attract attention; some being so slightly ill as not them-

selves to be conscious of it; some ill for but a day or two and the real nature of their trouble not recognized; others, convalescing from frank, well recognized attacks of the disease, retain the causative agent of the disease in a living state in or on their tissues, and for longer or shorter periods are capable of transmitting it to others. These are the "carriers" and it is obvious that some among them, not aware of their danger to others, go about in street cars in stores, in places of amusement and some travel from place to place by train or boat, often visiting localities free from the disease and unconsciously serving as a means of starting new foci in widely separated localities. The spread of disease in these ways is logical, and circumstantially proved to occur. It is not required that we shall seek for all sorts of out-of-the-way, unlikely and unproved modes of transmission.

In connection with another potentially epidemic disease modern investigation is shedding fundamentally important light upon certain puzzling factors. We still occasionally hear the old fashioned term "genius epidemicus," used in explanation, without explaining, why this or that disease, which may or may not always be present in an unimportant way in a community, suddenly assumes serious epidemic proportions. This term, like the "hypothetical x" of von Pettenkofer, is merely a cloak for our ignorance. For instance a few years ago we had an alarming outbreak of Infantile Paralysis, "Polyomyelitis," as it is properly called. Many among the uninformed thought it a new disease. It is not; it has been known for a great many years, and nearly forty years ago, one of the most competent writers in this country on the diseases of children taught that it was transmissible. The current health records will show you that in every large community there are always a few typical cases of infantile paralysis. They do not show a disposition to spread even under the intimate conditions of family life and are rarely surrounded by safeguards. Had it not been for the terror caused by the last great outbreak, it is doubtful if such cases would attract more than passing notice. That

situation is encountered every year. Yet we know that at long and irregular intervals the number of cases increases with almost fulminating suddenness; the disease becomes epidemic we say, and with it comes the usual misery, suffering, deformity, and deaths. The accounting for such an explosion is a nice problem, not as yet fully solved. Is it that through influences not known to us the germ suddenly assumes unusual virulence? Is it that some uncommon means for its dissemination from person to person is abruptly interjected? Is it that some environmental factor has suddenly rendered susceptible to infection by the germ of this disease a greater number of persons than is commonly the case? We reply that "genius epidemicus" has developed a group of conditions favorable to the epidemic spread of the disease; which means in plain words, that we know very little about it. What we do know is this, and its importance should not be minimized: like all other infective diseases polyomyelitis manifests itself not always in a recognizable way—we have severe cases, we have very mild cases, and it has been suggested, with all probability of accuracy, that we have always with us a larger number of persons who carry the germ of this disease than we ordinarily suspect.

In this group are sometimes persons who can give no history of having been near a case of the disease, but more often they have in one way or another been associated with individuals suffering from it.

Such persons are apparently in sound health—at least they give no evidence of a specific disease—just as in every community we have an appreciable number of well persons who harbor the germs of diphtheria, and of typhoid fever. Such persons occasionally serve as the victims and become the reservoirs from which the supply of infective material may emanate when conditions are favorable, *i.e.*, when unusual conditions predispose them to an infection to which they are ordinarily insusceptible. But what all those conditions are we do not know, nor have we in the present state of our knowledge much promise of learning in the near future.

Such data as we possess suggest that sometimes these predisposing conditions affect only the individual, sometimes associated groups of individuals, sometimes an entire community.

In a fulminating outbreak of an unusual disease involving large numbers of the population, the question is often asked, Why does not *everyone* get it? There are three replies that may properly be made to that question: first, even though the infection may be very widespread, not every individual receives the active, exciting agent into the body; second, not all individuals are equally susceptible to infection, some being so little receptive, as to be almost immune, a provision of nature that is as peculiar to those individuals, as are their commonly recognized physical and mental attributes; and third, a certain proportion of persons in all populations have acquired more or less resistance to a specific infection by having had the disease at some prior time in the course of their lives. In the case of influenza, such acquired immunity is not universally conceded, some observers believing it to occur, others holding the opposite view, and some going so far as even to believe that instead of one attack of influenza's giving protection, it actually predisposes to subsequent, though milder attacks. It is not possible at this time to say which of these views is correct. It may, after all, be an individual matter.

Another question of very great interest and one that is, just now asked, perhaps more often than any other, is: Are we apt to have a recurrence of influenza this year? I answer that question in the negative, for I know of no sound epidemiological reason that would support the opinion that a recurrence of the outbreak this year, or even for many years, is at all likely. There will probably be isolated cases, just as there are probably a few isolated cases always with us, but a widespread attack I believe most unlikely. When the disease appeared in 1889–90 the interval that had elapsed between then and its preceding appearance was so long as to have been beyond the memory of the majority, in fact only those concerned with the history of epidemics know that the disease

had appeared in epidemic and pandemic manifestations in prior times. Almost thirty years separated the pandemic of 1889–90 and last year's outbreak, during which time there had not been even a suggestion of an influenza epidemic; and as history commonly repeats itself, we may console ourselves that a generation may again pass without a repetition of our distressing experiences of last fall and winter. But what are the reasons for these long intervals of absence? That is not an easy question to answer in a satisfactory way, but if we concede that in such an outbreak as we had last year, nearly every one was to more or less extent affected, some, the less resistant seriously, others, the more resistant, mildly or scarcely at all, we can believe that the available susceptible human material for an epidemic was in very large measure used up; also if we concede—which as said, may or may not be justifiable—that all those who recovered from influenza, be it from a serious or a mild attack—have acquired some degree of immunity from a subsequent attack, it is plain that until a new generation be borne, not all by nature insusceptible to the disease, the material for a recurrence of the outbreak is lacking. The germ of the disease, of whatever nature it may prove to be, does not live and thrive outside the living body for an indefinite period of time. That fact, together with the scarcity of susceptible human material, justifies, I believe, the opinion expressed above that there is no probability of a recurrence of the disease in the near future.

Another question frequently asked is: Is there any specific way to prevent influenza? *i.e.*, Can we vaccinate or inoculate against it, as in the case of small pox and typhoid fever, or treat it by specific sera, as in the case of diphtheria and tetanus? I know of no such procedure that has met with general approval. Inoculations against certain collateral manifestations, evidently engrafted upon the primary influenza infection, have been tried but with varying results, sometimes good, at other times unsatisfactory. Certainly none has been sufficiently convincing to command universal approval.

It is proper to say, however, that intensive studies are now being made in the general field of preventive inoculation, and we believe it is not unlikely that the results of such investigations may place ultimately in our hands specific means for combatting influenza, just as they have given to us successful measures against certain other diseases.

Until we know more of the true, exciting cause of influenza, the directions for escaping the disease are in general those for escaping other types of infection, that is, attention to one's general health; in case of a threatened outbreak avoid crowds; avoid intimate contact with other persons; look upon all persons with "colds," so called, as suspicious, and regard all convalescents as probable carriers.

It has been said that if the authorities had taken due precaution to prevent the entrance of the disease into this country, at the time it prevailed in Spain, we would have been spared the outbreak. That is easy to say—but I fear is deceptive. It was not at all likely at the time the disease was called "Spanish Flu" that Spain was the only country affected. It is also more than probable that Spain's daily intercourse with other peoples was accountable for the development of foci elsewhere, and moreover, the disease came to Spain from somewhere else outside that country; for such outbreaks do not arise *de novo*. If all persons coming from Spain had been detained and kept under observation, while others from other countries were ignored, it is certain that the introduction of influenza into this country would not have been prevented. To suggest that all incomers be detained and examined to determine if they were carriers would, if acted upon, have detected so meand missed many. The fact that despite precautions, the disease quickly extended to all countries more nearly contiguous to the alleged starting point than is our country, and this too, at a time when an epidemic was least desired, as all available men were wanted for the armies, is a convincing argument that influenza is probably one of the most difficult of diseases to hold in check, if indeed, this is not to a large extent impossible. This may be a dis-

couraging admission, but I believe it is the best that can be made at the present time.

Much can be done in safeguarding the public by instruction as to means of self protection—but those means must be simple, logical and of a character that can be practiced. To tell the wage earner that he must keep himself or herself away from places where others congregate, is a mere waste of breath —yet that is the soundest advice that could be given: but it it not practicable. Can the clerks, and salesmen and saleswomen in our large retail stores, and in our banks, and the workmen of our factories and mills act upon it? Can the car conductors and the thousands of persons compelled to use the street cars at hours when they are of necessity crowded, follow it? Can the average citizen know that the person with whom he may be compelled to talk, is possibly, with every spoken word, projecting the germs of influenza, in his face? I think not. Our directions must be such as can be followed; and probably no single element of such safeguards is as important as measures that aim to prevent or lessen the crowding together of people in inclosed spaces.

It is the rarity of the disease, the fact that when it comes it finds usually a whole generation susceptible to it, and the readiness with which it is carried and transmitted directly from person to person that makes the problem of prevention so difficult and almost insoluble. Were we to abandon vaccination against small pox, we would have, in a generation, essentially the same thing as in the case of influenza. In fact such was the case with small pox before the advent of vaccination against it—as one writer put it "everyone had it or expected to have it." So much for influenza, a great deal of which is applicable to other epidemic diseases.

If we consult the records of historic pestilences, we find first, that wide-spread outbreaks were in the olden times very much more frequent and more extensive than at present, and second, that diseases that were at that time most dreaded, have become rare and some of them medical curiosities.

Probably the outbreak known as the Justinian Plague of the

6th century is the best known of the older epidemics. It is believed to have started in Egypt about the middle of the sixth century and is known to have spread pretty much over the entire Roman world during the next hundred years. Ten thousand people are said to have died of it in a single day in Constantinople. The Black Death of the 14th century is said by Haeker to have caused the death of about one-fourth the entire population of Europe. The "great plague of London" in the 17th century caused in one year nearly seventy thousand deaths out of a population at that time of not over 460,000. The true nature of the historic plagues is difficult to establish —it is possible that bubonic plague and typhus fever, as we now know them, were the most common manifestations, but it is equally likely that other diseases such as cerebro-spinal-meningitis, measles, and certainly small pox were frequent complications. Later we have trustworthy records of scarlet fever, diphtheria, typhoid fever, and Cholera, appearing as epidemic outbreaks and certain of those diseases in recent years, and indeed at present, occasionally display epidemic tendencies, but fortunately by the adoption of trustworthy precautions their spread is held in check.

In so far as the plagues of the olden times are concerned there is no doubt that the spread was halted only through the exhaustion of available human material. There were no methods practiced nor were any known, that could have been effective in preventing dissemination. It was not until the last quarter of the last century that developments in the natural sciences gave us a clue to the underlying causes of disease; to the channels through which they may be disseminated; to the portals of entry for infective agents to the body and to the behavior of infective agents outside the body. With the advent of Bacteriology, and the development of trustworthy methods of investigation, our knowledge of epidemic disease and of epidemics made tremendous strides. It was not any longer necessary to practice empiricism, for trustworthy scientific methods were now available. We soon were able to undermine the old belief, sometimes encountered, that visi-

tations of pestilential diseases were the desire of an all-wise providence and therefore efforts to combat them are in vain. We found that all transmissible diseases, *i.e.*, those potentially epidemic, are excited by living agents that in most cases can be isolated and studied in living state under artificial conditions; that the spread of disease, *i.e.*, the growth of an epidemic is due to the passage of these living agents from the sick to the well; that there escape from the bodies of all persons sick of pestilential diseases, by one route or another, the germs of disease; that outside the infected body the agents that caused the infection soon die in many cases and may be killed readily in all cases by following proved scientific procedures.

As a result of these early demonstrations it is obvious that it was possible to formulate systematic procedures for combating these diseases and this was done promptly. Without going into detail, these comprehended—the isolation of the sick; the adoption of personal safeguards against catching the disease; the disinfection of discharges, of clothing and of all other matters and articles that came from or were in contact with the sick.

Soon we found that the germs of particular infections when thrown off from the diseased body found conditions outside that were favorable to a limited viability—*i.e.*, the water, the soil, the milk and other food stuffs supported their life for a time and they, in an indirect manner, may serve as agents for conveying the disease from one person to another or from one place to another. This knowledge led to methods for rendering such articles harmless.

Soon we had the beginnings of scientific water purification; likewise a start in that difficult problem of disposing of community waste, especially of human waste; inspections of food producing animals and their products were soon under way, the sanitary production of milk receiving particular attention; and elaborate studies were made upon substances and methods used for disinfection, with the result of separating those that are trustworthy from those that are not.

The development of our knowledge of the rolé of insects in

transmitting disease is one of the most important factors in our fight against epidemics. We know that the common house fly when having access to infective matters may carry them in one way or another to the human organism; that special varieties of mosquitoes are the only ways by which yellow fever and malarial fevers may be spread; that the flea is the commonest disseminator of bubonic plague; that the body louse is the important transmitter of typhus fever and of the "trench fever," seen during the war; and we are rapidly coming to the opinion that all biting insects and all other insects that cohabit with insanitary man must be regarded as potential carriers of disease.

The importance of an understanding of insect life to the student of epidemiology is now admitted to be so great, that no one professing the least facility in public hygiene, can afford to be ignorant of the subject. What more striking illustration of the value of such knowledge could be presented than that which has been accomplished in stamping out yellow fever from its very home and the prompt elimination of malarial fevers from their foci of endemicity, than that which has followed the vigorous use of anti mosquito measures. These are not only advantages to health, but constitute economic contributions of enormous proportions.

For a very long time we have known that certain epidemic diseases are more apt to make their appearance in one season than in another—also that some diseases peculiar to certain parts of the world are rare to others, but we had no satisfactory explanation for these phenomena. Today we know enough of these subjects to discuss them with some degree of understanding. In the matter of the seasonal occurence of epidemic diseases, we know that those which are insect borne occur during the months in which insect life is most active—the malarial fevers, yellow fever, sleeping sickness, and the common fly-borne infections being especially prevalent during the summer and early autumn. Other diseases that are carried and perpetuated by insects that more constantly cohabit with unclean man may appear at any time—thus for

instance, the louse-borne typhus fever, the flea-borne plague and the like, for these insects breed most actively in and about the dirty dwellings of man. We used to be told that typhoid fever was especially a disease of late summer and early fall, and it was not possible for us to offer a satisfactory explanation, but we now know that this only seems to be the case. The opinion was based largely on the morbidity records of our large cities at a time when rural records were either not kept or were too incomplete to be of value. We know to-day that typhoid fever is probably more prevalent throughout rural than urban districts—and the records of all large cities show that during August and September, when people of the cities are returning from their vacations in the country, the typhoid rate usually rises—in this city the rise due to this cause constitutes about 20% of the cases reported during those two months. Typhoid fever may and does occur both sporadically and as epidemics at any time of the year in those countries in which it is common.

Many of the ordinary infectious diseases of childhood increase in number during the early fall months; and before the days of competent medical inspections of our school children this rise was often alarming. This is now all shown to be a result of bringing together in intimate relation large bodies of children who have been running free during the long summer vacation. Studies made in England show that similar, though smaller, increases in such diseases occur among the school children of that country after both the Christmas and Easter recesses. So we see season is only an incident in this phenomenon, *per se*, it has only an indirect influence.

In so far as the geographical distribution of epidemic disease is concerned, we find this to be in some cases connected with the insects peculiar to certain localities—as for instance, the particular varieties of Stegoniaia mosquito that carries yellow fever and the ticks that carry Texas and Rocky mountain fevers—and with the customs and habits of various peoples. Thus Asiatic Cholera has its home in the delta of the Ganges. There are parts of India practically never free from Cholera.

The people of those localities use for domestic purposes the untreated water of the tanks in which clothing is washed and into which human excretion has free access. The specific germ of Cholera was discovered years ago in those waters. The desire to carry out the religious rights peculiar to many orientals often leads the people of those countries to conceal the sick, and even the dead, and under conditions that are sure to spread the diseases. The British government found this an important obstacle to its work of eradicating plague. We see, here too, that location is only an incident. For us to realize that some oriental diseases can extend beyond their customary confines, we have only to recall the last big European outbreak of Cholera, when it got as far west as Hamburg, Germany; and plague we know to have made its appearance at least twice in recent years in this country. Before yellow fever was under control its extension beyond its foci of endemicity was not at all uncommon and as you know, it has more than once reached as far north as this city; the epidemic here in 1798 being probably the largest ever recorded for a city of this latitude.

A factor that has operated and to some extent operates in favor of epidemic spread of disease is the commonly encountered attitude of fatalism, that is to say—many persons used to believe and indeed a few still do, that it is useless to make an effort to prevent a contagious disease—if you are to get it you will, in spite of preventive measures. This attitude is more particularly encountered in families where children are concerned and it is not at all unusual, though more so now than formerly, to find that children have been purposely exposed to contagious disease, especially to measles, with the idea of letting them get it and get over with it. This is a responsibility that I certainly would not assume, and I am glad to say that others are coming rapidly to hold the same view. Doubtless in former times many outbreaks of the common disease were favored and the disease perpetuated by such ignorant practices.

Another factor that operates to a very great extent in the

extension of transmissible diseases is the practice of treating cases in private houses. Under ideal domestic conditions the isolations of a case of contagious disease in such a way as not to endanger others, requires the activity of persons specially trained in such work. The home surroundings, the maternal sympathy, and the presence of familiar faces are all very well, but they contribute in no way either to getting the patient well or in preventing him from being a dangerous focus from which infective matters may be spread. These cases can all be much better treated and isolated in hospitals especially equipped for the purpose. Our modern ideas concerning the hospital for contagious diseases are in strong contrast to those formerly held. We no longer approve the old fashioned pest house—unfit for human habitation and so located as to be almost inaccessible—but believe that hospitals for the care of transmissible diseases should be attractive, of the most modern type of construction, conveniently located and presided over by physicians and nurses who have been especially trained in the treatment and isolation of contagious diseases. When such hospitals become generally available, I have no doubt of their effect upon the spread of disease. The care of a case of contagious disease in a private house, surrounded by all the restrictions thrown about it by the health authori ties—is a tedious, trying and troublesome experience and I am certain that the majority of those who have passed through it would gladly avail themselves of the services of such hospitals as I have in mind; and by their doing so the number of foci from which disease could be spread would, of course be correspondingly lessened.

Of all the scientific advances of recent years probably none has had so important an influence in the control of particular epidemic diseases as have the protective inoculations. Needless to say that the first practical application of this procedure was the vaccination against small pox. Almost a hundred years elapsed before we saw a resumption of activity in this important field. In 1880 Pasteur discovered, by accident, that artificial cultures of the germ of chicken cholera spon-

taneously lost virulence in part and after a time in whole, without of necessity losing viability. He found if such weak or attenuated cultures be injected into chickens they did not cause death but only temporary illness, and that with recovery the birds were immune from injections with the fully violent organisms. This was the beginning of what has proven to be an immensely important practical application of bacteriology to preventive medicine.

Already protection from cholera, plague, anthrax, typhoid and paratyphoid fevers and other more or less well known infections has been accomplished by procedures based upon this observation; and as the underlying principles are sound there is good reason for believing that the practice will be extended to other maladies. The development of our knowledge of antitoxins, their use both as preventives and as curatives has also been a factor of great aid in checking the spread of certain diseases.

In a general way the factors that have been, in the past, most responsible for the development of epidemics have been ignorance and indifference. It is not many years since epidemics of such familiar diseases as scarlet fever, typhoid fever, diphtheria, measles, etc. were comparatively common. We do not often hear of them now certainly not on so large a scale as was common years ago. It is also not very many years since our health departments were manned by persons as ignorant of scientific advances in hygiene and medicine and as indifferent to their specific duties toward the public as it was convenient for them to be. In the case of an outbreak of measles, or of diphtheria, the placarding of the house and the recording of the case were about all that was deemed necessary, and as a result there were the natural disseminations of these diseases. But with the discovery of means that could be applied effectively in preventing the spread of the disease and the instruction of the public concerning the nature and value of such discoveries, public opinion demanded something better. It demanded competent health officers, and efficient health departments. As a result we find a friendly rivalry between our

cities and states in the matter of public health administration, each proudly pointing to its guardian of the health, and publishing its health records in evidence of the high character of the work done by the respective organizations. Our universities too are competing with each other in their educational effort—in their efforts to equip men to perform the functions of public hygiene to the highest degree of efficiency.

The education of the public through the newspapers, the magazines, lectures and special meetings has had an enormous influence in stimulating an interest in a subject so closely related to its every day life.

With an informed public cooperating with the medical profession and with a health department worthy of confidence and respect, there is every justification for the predication that the days of epidemics of the common diseases have passed. Outbreaks of exotic diseases may occur from time to time but as our knowledge grows, I think it safe to say that they are apt to be rare and need cause no undue apprehension.

THEATRICAL REPRESENTATIONS IN SPAIN IN THE SEVENTEENTH CENTURY

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In the following pages the term theatrical representation is confined to the performance of secular plays,—the drama of the people—by professional players, in the *Corrales* or inn-yards, and later in the public play-houses. At first bands of strolling players acted upon an improvised stage in the public square, and employed only the simplest and most obvious stage accessories.

To these beginnings, both in Spain and England, we may roughly assign the date 1560. It is about this time that we first hear of the performances of Lope de Rueda in Spain, while the first mention of a company of professional actors in England, the Earl of Leicester's, falls in the same year.

With private representations in the presence of royalty or in the houses of the nobility, we are not concerned, Here, there can be no doubt, the Italians lead the way, both in splendor of scenic arrangement and in ingenuity of theatrical machinery. Famous Italian engineers, like Fontana, Cosme Lotti (who was in the service of the Grand Duke of Florence in 1618), Bianco, and Antonozzi were brought to Spain by the king to exercise their ingenuity and skill for the amusement of the Court. With these Italians we may compare the famous English architect Inigo Jones, who, however, derived his inspiration from Italy, a country he visited more than once.

Lope de Rueda is the first professional actor-manager whose name has been preserved in the theatrical annals of Spain. To him, and to Torres Naharro, Lope de Vega, the great creator of the Spanish national drama, has ascribed

the beginnings of the comedia. As a boy, Cervantes, (born in 1547), saw the primitive performances of Lope de Rueda and his little band of strollers, and gives an animated description of them more than half a century later in the Prologue to his *Comedias* (1615): "The stage consisted of four benches arranged in a square, with four or five boards upon them, raised about four spans from the ground. The furnishings of the stage consisted of an old woolen blanket, drawn by two cords from one side to the other, which formed what is called a dressing-room, behind which were the musicians, singing some old ballad, without the accompaniment of a guitar." The earliest notice of Rueda is dated 1551, when we find him in Valladolid, where he took part in the Corpus Christi festivals for several years thereafter. The performances of Rueda were given in the open square of the towns, subject to all the extremes of heat and cold, before the establishment of the *corral* or inn-yard, to which we now turn.

It is an interesting fact that, in the case of the only two nations of modern Europe that possess a truly national theatre, the representation of plays in fixed public buildings provided for the purpose, was, at the beginning connected with the public hospitals, and for the relief of the poor. This connection was, moreover, quite natural, for, the theatre being supported by the public, it was not unreasonable that it should contribute to the public charities. In both London and Madrid a portion of the proceeds of the public theatres was devoted to the relief of the poor in the hospitals. In Madrid the theatres continued to be an important source of revenue for the charities for more than a century after their first establishment. In Madrid, as well as in London, the fixed localities for theatrical representations were, at first, *corrales* as they were called, or inn-yards. In Spain the first *corral* for representing plays was built primarily for the purpose of increasing the funds of the hospital established under the auspices of a pious brotherhood called the Brotherhood of the Passion, which was founded in 1565. To this fraternity the city granted the privilege of providing a place for the exclusive

representation of all *comedias* in Madrid, the funds thus obtained being appropriated to its pious purposes.

In 1567 another fraternity called the Brotherhood of our Lady of Solitude was also founded with charitable aims of somewhat wider scope. The places designated by this Brotherhood of the Passion were three: a yard or *corral* in the calle del Sol, another called the *Corral de la Pacheca*, in a house belonging to one Isabel Pacheco in the calle del Principe, and a third called the *corral de Burguillos*. In 1574 the Brotherhood of our Lady of Solitude also petitioned for the right to furnish a place for the performance of plays, in order to maintain its hospital, and the matter ended in a compromise, the Brotherhood of Solitude acquiring the *corral de Burguillos*. In this year both brotherhoods decided to join their interests, and agreed that ⅔ of the profits accruing from the *corrales* should go to the Brotherhood of the Passion and ⅓ to the Brotherhood of Solitude. This agreement was approved on June 7, 1574.

In Spain these *corrales*, a name that has remained synonymous with play-house down to our own day, were originally the yards of houses. In the rear was the stage; the larger part of the audience viewed the performance standing in the court-yard, while the windows of the principal building, and of the surrounding houses served as boxes, for the more distinguished spectators. Arrangements for the comfort of actors and audience were at first, naturally, very crude. The stage, as well as the whole court-yard, had no roof nor any kind of protection against sunshine or rain. If the weather was unfavorable the representation was either suspended or brought suddenly to a close.[1]

In 1574 a company of Italian players under Ganasa[2] presented plays (doubtless the *commedia dell'arte*), in Madrid, and in the same year Ganasa succeeded in having a theatre

[1] Rennert, *The Spanish Stage*, New York, 1909, p. 28.

[2] Concerning Ganasa, who had a company of players in France in 1571, and to whom is probably due the invention of the second *Zanni* or *arlecchino*, see Cotarelo, in the *Revista de Archivos* (1908), p. 42.

erected called the *corral de la Pacheca.* This theatre, was constructed by two carpenters, of materials from the old corral, which latter had an awning which shaded the stage. Unlike the court-yards, the permanent theatres had a roof; this roof, however, only covered the stage and the sides of the *patio.* The sole covering of the latter was an awning to shade the spectator from the sun. From this *patio,* as just observed, the rank and file viewed the play standing. On account of the noise and uproar they made, they were called *mosqueteros.* So in France the boisterous and vulgar stood; so also the "groundlings" stood in the pit of the inn-yards of London.

Representations continued in the *corral de la Pacheca* and in a corral in the *calle del Lobo* owned by one Cristobal de la Puente at least as late as 1584. There was also a *corral de Valdivieso,* of which nothing further seems to be known.

These *corrales,* from their very nature, were small, and probably did not accommodate more than four or five hundred spectators. We learn that on June 8 and 9, 1579, the hospital of the Passion received, as its two-thirds share, from the performances of Ganasa in the *corral de Puente,* about 156 reals, and from the representations of Salcedo in the *corral de la Pacheca,* a little over 195 reals. Counting the real as about the equivalent of a quarter dollar, the receipts of a performance were probably not more than about seventy-five dollars.

Representations in these *corrales,* and in the inn-yards and early theatres of London, always took place in the afternoon. At first they were limited to Sundays and feast-days, but afterwards they were authorized on Tuesdays and Thursdays during the week. These restrictions could have continued only till about mid-December, 1579, for after that date there were daily performances till the close of the year, and in 1580 there were daily performances in January and February, till the 17th of the latter month, Ash-Wednesday, when representations were suspended till September 11.

The first performance in the *corral de la Cruz* took place on Sunday, November 29, 1579. Three years before, the first London theatre, properly so called, was built by James

Burbage, actor, and father of the famous actor Richard Burbage, the friend of Shakespeare. The elder Burbage united to the profession of actor the trade of joiner. This play-house was called "The Theatre" and in the following year another theatre was erected close to it, called "The Curtain." When Shakespeare arrived in London, about 1586, these were the only theatres in the city, both being in Shoreditch. A third theatre, the "Rose" was opened by the manager Philip Henslowe in 1593.

The success of the *corral de la Cruz*, from the beginning, in 1579, was such that it induced the brotherhoods to erect another playhouse in the calle del Principe in 1582, and after 1584 the *Cruz* and the *Principe* were the only public theatres in Madrid. Their glory in the annals of the modern drama is surpassed only by the "Globe" theatre, erected in 1589, and the later "Blackfriars" in London. But none of the English theatres maintained the long, uninterrupted traditions of these two famous Spanish playhouses, which disappeared only in our day. And it is a curious coincidence that the dramatic careers of the great creators of the Spanish and English dramas began at nearly the same time. Lope de Vega, born in 1562, began to write for the public stage about 1585, while Shakespeare, born two years later, came up to London, presumably in 1586, and became attached to one of the playhouses.

These *corrales* were, as has been said, court yards where the rear portions of several houses came together. The windows (*ventanas*) of the surrounding houses (provided, as is the Spanish custom, with iron railings or lattice work, and then called *rejas* or *celosias*) served as boxes or stalls; a much larger number of these windows than originally existed in the buildings were especially constructed for this purpose. If these boxes were situated in the upper stories, they were called *desvanes* (attics); the lowest row of windows above the ground, however, were called *aposentos*, a name that, in a wider sense, seems also to have been applied to the *desvanes*. These *aposentos* (apartments or rooms) were really spacious rooms, as the name implies. The windows were, like the houses to

which they belonged, sometimes the property of others, and if not rented by the fraternities, were entirely at the disposition of their owners, who, however, had to pay annually a specified sum for the privilege of seeing the play from them. Beneath the *aposentos* was a row of seats, raised like an amphitheatre and called *gradas;* in front of these was the *patio*, a large open space, whence the *vulgo* saw the play standing. In front of the *patio*, and nearest the stage, stood rows of benches called *bancos*, presumably also under the open sky, like the *patio*, or protected only by a canvas covering. The *gradas* were under a projecting roof at the sides. In the rear of the *corrales*, *i.e.*, in the part furthest from the stage, was the gallery set apart for women, especially of the lower classes, and called the *cazuela* or *stewpan;* also called *corredores de las mujeres*, or gallery for women. The more refined women patronized the *aposentos* or *desvanes*.

We have seen that as early as 1574 an Italian company of players under the leadership of Ganassa had visited Madrid, representing undoubtedly the *commedia dell'arte*. Companies of Italian players continued to visit Madrid, as they occasionally visited London and Paris in these early years, and it was while viewing a performance by the Italians in the *Cruz* theatre in 1587, that Lope de Vega was arrested for libelling a well known theatrical manager, Jeronimo Velazquez, and his family.

As to the price of admission to view these early representations, we learn from a document that has come down to us that when Ganassa visited Seville in 1583, the prices of admission to the *corral de Don Juan* were: for entrance, ½ a real; for each *Silla* (chair) 1 real, and for a seat on a *banco* (bench) a *cuartillo* (¼ real).

The representation of a comedia was invariably accompanied by music and dancing. In the time of Lope de Rueda, about the middle of the sixteenth century, as we have seen, the music accompanying the plays acted in the public squares was provided by one or two persons, "who sang an old ballad, without the accompaniment of a guitar," behind a woolen blanket,

which served as a curtain, and which separated the dressing room (*vestuario*) from the stage. Afterwards, Cervantes tells us, the musicians were brought out upon the stage, where they played before and after the performance of the farce or between the acts of a comedia. It is probable that the musicians occupied the stage during the whole of the best period of the comedia. Indeed, as the principal part of their entertainment consisted of singing, they could not well have been stationed elsewhere.

In 1593 we find that a comedia was performed "with its *entremeses* (interludes) and its music of a *viola* and guitars," and we are told that later the music consisted of two or three violins and an oboe. Even in the middle of the seventeenth century theatrical companies in Spain rarely contained more than four or five musicians. Most of the actresses were also dancers (*bailarines*), and every company contained persons who were designated especially as dancers, while most players were hired both to act and dance.

The custom of some of the Elizabethan theatres, such as the Blackfriars, of gallants taking seats upon the stage, also seems to have obtained in some of the theatres of Spain, though not in those of Madrid. Indeed it was especially forbidden by the decree of 1608 (repeated in 1616), which provided that no seat or bench be allowed on the stage, nor was any person permitted to view the performance from the stage.

Dancing, as already observed, was also an inseparable accompaniment of the public play in Spain. Spanish dancers were famous from the earliest times, and the dances of the women of Cadiz are mentioned by the Roman poets Juvenal and Martial. No comedia was performed without dances or *bayles* and short interludes called *entremeses*. In many of the contracts between manager and player it was stipulated that the latter was to act, sing and dance. Some of these dances are said to have been very indecent and were much opposed by the clergy. Among these dances one of the most offensive and most popular was the *Sarabanda*, introduced into Spain at some time prior to 1583, for the first notice we have of it is

in August, 1583, when it was prohibited under penalty of 200 lashes and six years in the galleys, for men, and banishment from the kingdom, for women.[1] Other dances, hardly more decent were the *Chacona* and *Escarraman*, and there were many others of the same class, besides the curious dances that were performed at the Corpus Christi festivals.

Concerning the staging of the comedia in Spain in this early period, a distinction must be made between festival or court performances on the one hand, and the representations in the public *corrales* or theatres, on the other. In the former, there was often an elaborate display of scenery and ornamentation, just as was the case in England in Shakespeare's time, while the public playhouses at the beginning of the seventeenth century were almost destitute of scenery in our acceptation of the word, and possessed only the most primitive stage machinery and appliances.

It is quite probable that, with the appearance of a genius like Lope de Vega, who wrote plays at twelve, but perhaps did-not begin to write for the public stage till about 1585 or 1586, the progress in the comedia was accompanied by a corresponding advance in the staging. Yet it seems reasonably safe to say that even for some years after Lope began his career as a playwright, the decorations and scenic effects in the public theatres of Spain were very primitive. We may be quite sure that in the early years of the seventeenth century the stage had no outer curtain. This is abundantly proved by the stage-directions of a number of plays printed at this period. A few examples will show this. In Lope's comedia *El Rey Bamba*, written before 1603, the King is lying dead upon the stage at the close of the play, when Atanarico, one of the characters says: "Let us take up his body upon our shoulders and then bury it, thus bringing to an end the comedia of the life and death of Bamba." At the conclusion of the first act of *la Fuerza lastimosa*, also written before 1603, is the direction: Exeunt all, thus concluding the first act. An exactly similar direction

[1]Cotarelo, *Coleccion de Entremeses, Loas, Bayles*, etc., Madrid, 1911, p. cclxvi.

is found at the close of Aguilar's play *El Mercader Amante*, first published in 1616. In Guillen de Castro's play *D. Quixote de la Mancha*, written of course, after 1605, and probably before 1607, at the end of Act I, we read: "The servants carry the body of D. Quixote out upon their shoulders; exeunt all, thus ending the first act.

There was, however, a curtain (perhaps more than one), at the rear of the stage, like the *traverses* of the Elizabethan theatre, which could be drawn aside, to represent a tent, bedchamber, chapel, etc. The stage-directions almost invariably refer to "a curtain," or "that curtain." As examples: in the first act of Lope de Vega's *El Asalto de Mastrique*, printed in 1614, is the direction: "Let a curtain be drawn, that the Duke of Parma may be seen seated, etc." In *Las Pobrezas de Reynaldos*, Act II, we read: "They draw a curtain, revealing a chapel, with an altar."

Cervantes tells us that these curtains were of green baize. They were also hung on the sides of the stage, so that an actor could enter from the sides, and they separated the stage from the dressing room or *vestuario*. This is attested by stage directions in a number of plays, which, on a character's being killed upon the stage, read: "He falls into the dressing room."

In the background, raised some distance from the stage, was a gallery, which served for various purposes: to represent the walls of a city, the balcony of a house, a tower, a mountain, etc. In an article published by me some years ago, a number of examples are collected, which show that the "balcony," which occurs so frequently in stage-directions, was merely a gallery at the upper part of the rear of the stage, which was covered by a hanging curtain, so that there was no essential difference in the representation of a wall, a tower, a window or a balcony.[1] This gallery along the rear of the stage was, perhaps, a continuation of a gallery occupied by the spectators.

For most scenes this simple stage sufficed, and it was used to represent the most diverse localities. There was no

[1] Rennert, 'The Staging of Lope de Vega's "Comedias," in *Revue Hispanique*, Vol. xv. (1907), pp. 453, A.

thought of any actual illusion—of any deception of the senses. The painting of scenery, so that the stage should have some appearance of reality, was wholly unknown. A few houses or trees painted on pasteboard or linen did duty for a street or a forest, while the simple curtain in the background or at the sides remained unchanged.

The place of action is sometimes mentioned in the dialogue at the beginning of a scene; more rarely by a stage-direction. But the stage remained the same; there was no visible change, whether the action was transported to Florence, Rome or Hungary. Indeed, there is often great difficulty in distinguishing interior from exterior scenes. Many scenes, in fact, are entirely unlocalized, and here, as in the Elizabethan drama, "vagueness of localization" is a fundamental fact.

In the rear of the stage were two doors. It is quite probable, indeed, that there were three, the middle door being in a recess, in front of which a curtain could be drawn.

We have also seen that the actor could enter upon the stage from the two sides, *i.e.*, from the dressing rooms. In *El Perro del Hortelano* (Part xi, 1618), Act II. Stage direction: "Enter Octavio, Fabio, etc. . . The Count approaches from one side." The stage was, of course, provided with a trap-door (*escotillon*), through which the devil or other figures might appear or disappear. In *El Principe perfeto* (Part xi), Act III. Stage direction: "the King opens a door in the stage." In *Auraco domado* (Part XX, 1625), Act I: Enter Pillan, demon, by a trap door; etc.

In the *Primira Parte de D. Juan de Castro*, written before 1618, where one of the characters was to cast his sword into the river, we read: "Let him approach the dressing room and cast the sword into it."

The appeal to the imagination of the spectator for a change of scene is sometimes made in words, by the poet. Cervantes, in his *Rufian dichoso*, Act II, says:

> To the auditors it matters
> Little that I in a moment
> Pass from Germany to Guinea,

Tho from off this stage I move not.
Human thought, indeed, is nimble;
Well may they accompany
Me with it, where'er it may be,
Without losing me or tiring.

Comedias, Madrid, 1615, fol. 97.

There was no sign-board upon the stage indicating the place of action, as we are told was the case in the early Elizabethan theatre. The place in which the action is laid is generally indicated, if at all, in the dialogue.

In *La Fuerza Lastimosa* (Part II, 1609), Act I; we read:

"*Clenarda:* Is the Count at home? *Enrico:* Here I am, at your service." In *Los tres Diamantes* (1609), Act II:

"*Lucinda:* What place is this, skipper? *The skipper:* This port is Aguas Muertas."

La Imperial de Oton (Part VIII, 1617), Act iii:

"*Oton:* It seems Ataulfo has not arrived,
So silent and so quiet is this palace."

In *La Niña de Plata* (Part ix, 1617), Act II:

Felis: I am glad to find you here in the calle de Francos.
What are you waiting for?

In Guillen de Castro's play *Don Quixote de la Mancha*, written, in all probability before 1607, Act II, we read the stage direction: Enter D. Quixote and Sancho Panza, and Dorotea seats herself by the brook.

"*D. Quixote*: We have arrived at a castle.
Sancho: Perhaps you mean a house."

In none of these cases is it to be presumed that any change in scene took place.

Sometimes the characters, walking on the stage, call attention to an imaginary change of scene, as in *La Ferompida* (Part iv. Act I, written before 1603), Act I, *Luzinda* says:

"And now, since this is my house,
Pardon me if I go no further."

There was no attempt, as already observed, at actual illusion, yet it must not be inferred from what has been said, that no attempt at verisimilitude was made,—that nothing was done to aid the imagination of the spectator. There is abundant and indisputable evidence to the contrary. The properties employed were doubtless crude, but they answered the purpose. A garden was represented on the stage; of this there are numerous instances; or a spring of water, or rocks and mountains. Trees were represented, either painted on canvas or by set pieces. In one of Lope's plays, *Los Torneos de Aragon* (written before 1603), Act III, the stage direction expressly states that a rampart, which is to be represented on the stage, is to be brought in, and is to be constructed by the servants of the theatre, because it could not occupy the stage before."

In an excellent play, *Pobreza no es Vileza*, published in 1625, and probably written not much earlier than that date, there is a clear instance in Act II, of a painted scene—a canvas painted to represent a fortress built of stone—the clearest instance, in fact, that I have found in Lope de Vega's plays.

From the examples just cited it may be inferred that painted scenery, at all events in Lope de Vega's later years, was not unknown to the public stage, but that it was not movable, on rollers or slides, we may be reasonably sure.

In a matter of this kind chronology is of the utmost importance. Only where we know the exact date of a play, or a reasonably approximate date, can it furnish us with helpful and reliable evidence. In the article from which many of the above illustrations are taken, I examined only the plays of Lope de Vega. As he wrote for the public stage for half a century, many changes must have taken place in the staging of plays in the course of this long period. Indeed, in the third decade of the seventeenth century, in the Prologue prefixed to Part xvi (1623) of his comedias, he complains that "theatrical managers now avail themselves of machinery, the poets of the carpenters, and the auditors of their eyes." This complaint is very significant, inasmuch as it shows

that a great change had, by this time, come over his audiences. The *vulgo* now went to *see* the play, not to *hear* it; the comedia had become a spectacle for the eyes. Two years later, in 1625, in his play *Ay Verdades!* Lope again alludes to the plays "in which the carpenter's skill makes up for the lack of ideas and plot." But it was in vain. Stage machinery, *apariencias* and *tramoyas*, as they were called, had become an essential adjunct to the comedia, and they played an important part in the later plays of Calderon, Lope's successor.

"As regards the costumes worn by the players, there was no pretense to historical accuracy. All characters appeared in the Spanish costume of the time. This is due to a peculiarity—shared largely by the drama of other nations at the time (particularly by the English), but eminently characteristic of the Spanish drama—that is the tendency to translate everything which it represents into the present and actual in which it moves: that the remotest past and the strangest occurrences are transformed into the national usages and customs, and that what is most foreign is changed, as it were, into something essentially Spanish. The single exception was in the case of plays founded upon Spanish history or legend—here only was an attempt made to reproduce the spirit of a bygone age."[1]

This we know, was also the case upon the French as well as the English stage of the time. Prof. Schelling says, speaking of the Elizabethan stage: "The costumes made little attempt at fitness. It was enough handsomely to reproduce the passing fashions of the day. Indeed, a strong contemporaneousness that instinctively reduces all things to the conditions of the present moment pervades the popular drama of the entire age. King David, Coriolanus, Macbeth—the doublet, ruff, and hose impartially clothed them all,"[2] and on the following page, the same author speaks of "The Shakespearean translation of all things into the manners and customs of contemporary England."

[1] *The Spanish Stage*, p. 104.
[2] *Elizabethan Drama*, Vol. I, p. 180.

Shakespeare's Roman citizens wore the English costume then in vogue, while in the middle of the eighteenth century Garrick appeared as Macbeth in a powdered wig and knee breeches. While the costumes had little or no regard for historical accuracy, they were nevertheless often magnificent and very costly. There is ample evidence to show that Spanish actors and actresses were exceedingly extravagant in the matter of costumes, and the amount of money expended upon them often shows an improvidence that has been a characteristic of the theatrical profession in all times.

In 1589 Sebastian de Montemayor, a theatrical manager, and Ana de Velasco, his wife, paid 100 ducats (= 1100 reals) for a rich skirt and jacket for acting. Many other instances could be cited of expensive costumes, and we may gain some idea of what this price means, if we compare it with another item that has come down to us. In 1596, a few years after the date just mentioned, Pinedo, a famous *impressario*. paid 24 ducats (= 264 reals) for six month's board and lodging for himself and servant. That is, this one theatrical costume cost the equivalent of two years' board and lodging for a man and his servant. Another norm is furnished by the fact that, at the height of his popularity, Lope de Vega received 500 reals for a play. Greg (*Henslowe's Diary*, II, p. 130) speaking of the English stage, says: "The wardrobe of a company appears to have been a complicated affair; part, like the stage properties, belonged to the company in general, that is to say, was the common property of the sharers, while part belonged to individual actors." So in Spain, a part was owned by the manager—by far the greater part, as it appears and only in exceptional cases did the actor own his costume. In some contracts it is especially stipulated that the manager is to furnish the costumes. Andres de la Vega was possessed of a rich and expensive wardrobe, which he frequently hired out.

When in financial straits, a condition that has ever been familiar to the followers of Thespis, the main stay of the player or manager was the wardrobe, which he could always pawn with some money-lender. There is extant a list of the theatri-

cal wardrobe of the stranded company of Jeronimo de Amella, seized for debt in Valencia in 1628.

To compel the payment of a debt, the debtor was clapped into prison, a misfortune that not infrequently befell the theatrical manager of those days, as the records abundantly show.

Something has already been said of the prices of admission. In 1575, in Seville those who went to see the plays of the Italian Ganasa, paid half a real entrance, one real for each *silla* and a fourth of a real for each seat on a *banco*. In 1602 the entrance fee for the *mosqueteros* (who stood in the *patio*), and for women, was a little less than half a real. The *sillas* and seats on the *bancos* were probably the same—one real additional. In 1606 each *aposento* (box or stall) was 12 reals. In 1608 the price of admission had been raised to 20 maravedis (about 15 cents); this entitled the person to standing room only. There was a separate entrance to the theatre for women; hence two outer doorkeepers were required. Policemen were also stationed at the doors. Green and dried fruits, water, sweets, *aloja* (a kind of mead), and *barquillos* (thin rolled wafers) were sold among the audience. A vivid picture of the interior of a Spanish theatre at this time is given in the comedia *La Baltasara*, written probably about 1630. The first act represents the interior of the *Corral de la Olivera* in Valencia. A bill-poster appears, who pastes up a placard announcing the performance of the famous comedia of *Saladin*, by the licentiate Poyo, to be given by the company of Heredia. Presently the fruit sellers appear; the stage direction is: The members of the company scattered through the *patio*, say:

Filberts, nougat; apples from Aragon; quinces, anis-water, Barbary dates, etc. The audiences were often unjust and noisy, and always hard to please. The *mosqueteros*, the rough and boisterous crowd who stood in the pit, constituted the most formidable and disorderly part of the audience, and were especially feared by both author and actor, for upon their whims the success or failure of a play generally

depended. Many are the complaints made by even the greatest dramatists of the injustice and turbulence of these spectators. And many of the most popular dramatists, including even the court poet Calderion, did not consider it beneath them to beg the indulgence of the *mosqueteros* or groundlings. At the end of Calderon's play *El galan fantasma*, Candil, the *gracioso*, thus addresses the groundlings:

> "I, who have endured so many
> Scares, now nothing more desire,
> Except from the *mosqueteros*
> That they pardon our short comings,
> So that with this we may bring
> To an end the *Phantom Gallant*.

"Nor were the women who attended the theatre any more refined or charitable. We do not refer here to the more orderly or respectable, who occupied the boxes, and who generally went masked. Malone notes that respectable women also wore masks in the English theatres, and the same custom prevailed in France. In France ladies can hardly be said to have visited the Hôtel de Bourgogne (the only regular theatre in Paris for nearly thirty years from the beginning of the seventeenth century) until Richelieu began to take an active interest in the theatre, about 1635. But in the Spanish theatre, the crowd that surged into the *cazuela*, or stewing pan, as it was called, and which men were not allowed to enter, was no less disorderly than the groundlings in the pit, so that a peace officer was always stationed in this gallery to keep them within bounds. Here no woman with any regard for her reputation entered unmasked. Like the *mosqueteros*, these denizens of the *jaula*, or cage, as it was also called, pelted the actors with fruit, nuts, orange-peels, cucumbers, or anything they found at hand, to show their disapproval, and they generally came provided with rattles, whistles or keys, which they used unsparingly.[1] Hitherto in our narrative we have found many resemblances between the English and the Spanish

[1] *The Spanish Stage*, p. 119.

stage. We now come to a matter in which they differed radically. No women were permitted to act upon the Elizabethan stage, while during practically the whole period under discussion women are regularly found as members of Spanish theatrical companies. It is quite probable that Mariana, the first wife of Lope de Rueda, acted in his little company of strolling players about the middle of the sixtenth century, and it is also likely that women acted in the Italian company of Ganasa, tho the only list we have of his company does not contain the name of an actress. In Italy the earliest evidence known to me of a professional actress, is an instrument dated at Rome on October 10, 1564, in which a number of players agree to form a company "super faciendis comediis." This company contains the name of one woman: Lucrezia Senese, *i.e.* of Siena. Turning now to Spain, we find that in September, 1581, Mariana Ortiz and Jeronima Carrillo belonged to the company of Mateo de Salcedo in Valencia,[1] and Beatriz Hernandez is mentioned in December of the same year as acting in the company of her husband, Francisco Osorio. These are the earliest names that have come down to us, and all are found in the records of the city of Valencia. It seems that no license permitting women to act in the public theatres of the capital was granted before 1587, though we know that women had appeared upon the stage in Madrid several years prior to that date. In the license of 1587, however, it was especially provided that women should not be permitted to appear in the habit or dress of men, and that "henceforth no boy be allowed to act attired as a woman." In this year (1587) an Italian company called *I Confidenti* was acting in Madrid, and the three women of the company to whom license to act was granted were: Angela Salomona and Angela Martinelli, "married women whose husbands are members of the same company, and Silvia Roncagli (*la Francesquina*). And it was further stated: "If the *Francesquina* is the one that I saw in the house of the Cardinal, I do not consider her to be a boy, and so she has permission to act." The theatrical

[1] Mérimée, *Spectacles et comediens*, pp. 126, 236.

annals of Spain are adorned with the names of many famous actresses. Among the earlier ones: Ana de Velasco, Mariana Ortiz, Mariana Vaca, Geronima de Salcedo; followed by Ana Muñoz, Jusepa Vaca, Jeronima de Burgos, Maria de los Angeles, Maria Calderon, Maria de Cordoba, and one who shone especially for her virtue and exemplary life—Maria de Riquelme (1601–1634).

These companies of players, consisting generally of from ten to fifteen persons wandered over the length and breadth of the Spanish peninsula, and not infrequently to Lisbon.

Travelling in these days, we may readily believe, was not attended by many comforts. The costumes and properties were loaded on the backs of mules or on carts, while the players also travelled in carts, or, the larger companies, in coaches.

The life of the actor was full of hardships. Agustin de Rojas, an actor, who speaks from experience, thus describes the life of his fellow players: "There is no negro in Spain or slave in Algiers but has a better life than the actor. A slave works all day, but he sleeps at night; he has only one or two masters to please, and when he does what he is commanded, he fulfils his duty. But actors are up at dawn, and write and study from five o'clock till nine, and from nine till twelve they are constantly rehearsing. They dine and then go to the comedia; leave the theatre at seven, and when they want rest, they are summoned by the President of the Council or by the *alcaldes*, whom they must serve whenever it pleases them." A very animated description of the scenes in a Spanish theatre at about the middle of the seventeenth century is given by the dramatist Juan de Zabaleta, in his *Dia de Fiesta por la Tarde* (a holiday afternoon), first published at Madrid in 1659. He says:

"He must dine hurriedly at noon, who intends to go to the comedia in the afternoon. His anxiety to get a good seat hardly permits him to warm the chair at the dinner table. He reaches the door of the theatre, and the first thing he does is to try to enter without paying. The first misfortune

of players is to work much and to have but few persons pay. For twenty persons to enter on three *quartos* (a *cuarto* = 4 *maravedis*, about 4 cents) would not do much harm if it were not an occasion for many others to do the same. For if one person only has not paid, countless others will also refuse to pay. All wish to enjoy the privilege of free admission in order that others may see that they are worthy of it. This they desire with such intense eagerness that they will fight to obtain it, and by fighting they achieve their object. Rarely does a man who has once quarrelled to avoid paying, ever pay at any subsequent time . . . And then, because he does not pay, will he be easy to please? On the contrary; if a player wears a poor costume he insults him or hisses him. I should like to know how this fellow and those who imitate him can expect a player to wear fine clothes, when they refuse to pay him . . . Our idler moves on into the theatre, and approaches the person who assigns the seats and benches, and asks for a place.[1] He is met with the reply that there are none, but that a certain seat which has been engaged has not yet been occupied, and that he should wait until the guitar players appear, and if it be still vacant, he may then occupy it. Our man argues; but to amuse himself in the meanwhile, he goes to the dressing room. There he finds women taking off their street clothes, and putting on their theatrical costumes. Some are so far disrobed as tho they were about to retire to bed. He takes his place in front of a woman who, having come to the theatre on foot, is having her shoes and stockings put on by her maid. This cannot be done without some sacrifice of modesty. The poor actress must suffer this and does not dare to protest, for as her chief object is to win applause, she is afraid to offend anyone. A hiss, no matter how unjust, discredits her, since all believe that the judgment of him who accuses is better than their own. The actress continues to dress, enduring his presence with patience. The most indecorous woman on the stage has some

[1] The sum paid at the door (*entrada*) only entitled the person to admission, not to a seat, for which an extra sum must be paid.

modesty in the green-room, for here immodesty is a vice, while there it is of her profession.

The fellow never takes his eyes off her . . . He approaches the hangings (*paños*) to see whether the doubtful seat is occupied, and finds it vacant. Since it appears that the owner will not come, he goes and takes the seat. Scarcely has he been seated when the owner arrives and defends his claim. The one already seated resists, and a quarrel ensues. Did the fellow not come to amuse himself when he left his home? And what has quarreling to do with amusement? . . . Finally the quarrel is adjusted and the one who has paid for the seat yields, and takes another place which has been offered him by the peacemakers. The commotion caused by the struggle having subsided, our intruder is now also quieted and turns his eyes to the gallery occupied by the women (*cazuela*), carefully scrutinizing their faces until he finds one who particularly strikes his fancy, and guardedly makes signs to her.

"The *cazuela*, my dear sir, is not what you came to see, but the comedia . . . He is looking around in every direction, when he feels some one pull his cloak from behind. He turns and sees a fruit-seller, who, leaning forward between two men, whispers to him that the woman who is tapping her knee with her fan says that she has much admired the spirit which he has shown in the quarrel and asks him to pay for a dozen oranges for her. The fellow looks again at the *cazuela*, sees that the woman is the one that caught his fancy before, pays the money for the fruit, and sends word that she may have anything else she pleases. As the fruit-seller leaves, the fellow immediately plans that he will wait for the woman at the exit of the theatre, and he begins to think that there is an interminable delay in beginning the play. In a loud and peevish manner he signifies his disapproval, exciting the *mosqueteros*, who are standing below, to break forth with insulting shouts, in order to hasten the players. Why do they do this? . . . Not one of those who are shouting would run the risk of saying a word to a player in the street.

And besides being foolish and cowardly to treat them thus, it is most ungrateful, for of all people actors are those who strive hardest to please. The rehearsals for a comedia are so frequent and so long that it is often a positive torment. And when the time for the first performance arrives, every one of them would willingly give a year's pay to make a good appearance on that day. And when they come upon the stage, what fatigue, what loss would they not willingly undergo to acquit themselves well of their task? If they are to cast themselves from a rock, they do it with the fearlessness of despair, yet their bodies are human, and they feel pain like any other. And if in a comedia a death sruggle is to be represented, the actor to whose lot it falls writhes upon the dirty stage which is full of nails and splinters, with no more regard for his costume than if it were the coarsest leather, while often it is very costly . . . And I have seen an actress of great repute (who died only a short while ago) representing a passage where, in a rage, she tears a garment to tatters to heighten the effect of her acting, though the article torn may cost twice as much as the money she receives for the performance.

"But women also go to see the comedia. On feast-days men go to the play *after* lunching, but women go *before*. The woman who goes to the comedia on a holiday generally makes it an affair of a whole day. She meets one of her friends and they take a bite of breakfast, reserving the mid-day meal for the evening. Then they go to mass, and from the church straight to the *cazuela* to get a good seat. There is no money-taker at the door yet. They enter and find a sprinkling of women as foolish as themselves already in the *cazuela*. They avoid the front seats, for these are for the women who come to see and be seen; so they take a modest seat in the middle. They express their pleasure at having found so comfortable a place, and cast their eyes about for some pastime. Finding none, the rest from the hurry of the morning serves as a satisfaction. Other women enter, and some of the more brazen sit by the front railing of the

cazuela, thus shutting out the light from those in the middle. Now the merry-making is let loose. The money takers enter. One of our friends draws a handkerchief from beneath the folds of her petticoat, and with her teeth looses a knot tied in the corner of it, and takes out a *real* (34 *maravedis*), and asks for the return of ten maravedis. While she is doing this the other takes from her bosom a paper containing ten quartos (40 *maravidis*), and hands her money to the money takers, who pass on. The one with the ten *maravedis* in her hand now buys a package of filberts for two *quartos*, and the remaining *ochavo* is as much of an encumbrance to her as a child would be. She does not know what to do with it, and finally drops it in her bosom, with the remark that it is for the poor. Now the two friends begin to crack the filberts, and you can hear them munching them . . . Now more women are crowding in. One of those who are in front makes signs to two others who are standing behind our two friends, and without asking permission the newcomers pass between the two, stepping on their skirts and disarranging their cloaks, which provokes the exclamation: "Did you ever see such rudeness;" and they begin to shake and fleck the dust from their skirts. They are bringing some meat-pies to those in the front seats, and they now sit down to eat them . . . Presently one of the two friends remarks: Do you see that man down there with grayish hair, who is taking a seat on one of the benches on the left? etc . . . Here follows some scandal, for which she is reproved by another woman sitting near . . .

The *cazuela* being now full, the *apretador* enters (he is the doorkeeper, who makes the women sit closer, so that they may make more room), accompanied by four women, well dressed and thickly veiled, whom he wants to accommodate, for they have given him eight *quartos*. He approaches our friends and tells them to sit closer. They protest; he insists, and they reply that the women should have come earlier, when they would have found seats. Finally the newcomers let themselves fall upon those already seated who, to get away from under them,

involuntarily make room. There is grumbling on all sides, but at last quiet is restored . . . It is now half past two o'clock, and the friends, who had not dined, begin to get hungry. At length one of the women who had been accommodated by the *apretador* gives to our friends each a handful of prunes and some candied yolks of eggs, with the remark: "Come, let us be friends, and eat these sweets which some body gave me." They begin to eat, and want to strike up a conversation, but say nothing as they cannot stop eating. Presently there is an altercation at the door of the *cazuela* between the money-takers and a number of youths who want some women to enter free and they burst into the *cazuela* quarreling. A great commotion and uproar ensues. The women rise excitedly, and in their anxiety to avoid those who are quarreling, they fall over one another . . . Those who rush up from the *patio* to lend aid or restore order, push into the jumbling mass and bowl the women over. All now take to the corners as the best places in the *cazuela*, and some on all fours and others running, seek a place of safety. Finally the police expel the men, and every woman takes a seat wherever she happens to be, none occupying the one she had at first. One of the two friends is now on the last bench, while the other is near the door. The former has lost her gloves and finds that her gown is torn; her friend is bleeding at the nose as the result of the scuffle, and, having lost her handkerchief, makes use of her petticoat. All is lamentation, when the guitar players enter, and quiet is once more restored . . ."

The theatrical manager of the seventeenth century had doubtless as many evils to contend with as his successor of our own day, and not the least vexatious of these was the deadhead, to whom allusion is made in the account just quoted. The deadhead is doubtless a very ancient institution—his existence dating, we may safely assume, from the first theatrical presentation. He flourished in great numbers in Spain in the XVII century and has probably not decreased in our own day. Seville particularly, was famous for the large numbers who entered the theatres without paying—claiming some privilege

which exempted them. By 1632 their number was so great that not enough money was taken at the door to defray the expenses of the company. As a result of the attempts of so many to enter free, brawls and stabbings at the theatre doors were matters of frequent occurrence. In a song sung on the Madrid stage in 1632, we are told that the deadheads "stood around at the doors of the theatres in the rain, drenched through, waiting for a chance to slip in without paying." This evil was prevalent throughout Spain.

This leads to a few words about the audiences. As may be inferred from what has already been said, they were of a turbulent, boisterous character; of their ruffianly behavior within the theatre there is ample evidence. They showed their disapproval of a play or of an actor in no uncertain manner, by shouting, whistling or pelting the actors with other things besides roses. Cervantes tells us of some of his plays that they were favorably received, without any cucumbers being thrown at the players. On the other hand these audiences were equally demonstrative and noisy in their approval of a play, which they showed by applauding, and by shouts of *Victor!*

Concerning the various companies of players in Spain, they may be divided into two classes: *companias reales* or *de titule*, *i.e.*, those licensed by royal decree, and *companias de la legua*, as the companies were called, which, acting without the king's license, overran the whole peninsula. The first class, or royal companies were of two kinds: those in which the players worked for a salary paid them by the *autor* or manager, and those in which the players worked on shares. The latter were called *companias de parte.*

In 1603 Agustin de Rojas, an actor, published a book at Madrid called "The Entertaining Journey," which is the most interesting work we possess concerning the early Spanish stage. According to Rojas there were eight kinds of companies. He begins his enumeration with the strolling player, who travels alone and afoot, and recites while the village curate passes around the hat, and so, through various gradations, till he

reaches the companies. These, he says, "know something of the seamy side, and also of good manners; there are very clever people among them: men much esteemed and persons well born, and even very respectable women (for where there are many, there must be of all kinds). They take with them fifty comedias, three hundred quarters of luggage, sixteen persons who act, thirty who eat, and one who takes the money at the door (and God knows what he steals). Some want mules, others coaches; some litters, others palfreys; and none there are who are satisfied with a cart, because they say that they have weak stomachs. Besides, there are many vexations. Their labor is excessive because of the great amount of study and the continuous rehearsals". We have already alluded to the hardships of the actor's life as described by Rojas. Cervantes, who certainly knew them well, says: "in the sweat of their brows they earn their bread by insupportable toil, learning constantly by heart, leading a gipsy life from place to place, and from inn to tavern" . . . Yet all the trials and hardships of the profession never deterred others from joining their ranks, which were ever full, such a powerful attraction has the mimic life of the stage ever exercised upon those who came under its spell. And no one has in such masterly fashion epitomized the fascinating vocation of the actor as one of their fellows and the greatest of all poets, in those memorable lines in which he likens life to the ephemeral career of the stage player:

"Life's but a walking shadow, a poor player
That struts and frets his hour upon the stage
And then is heard no more."

And yet these players have exercised no inconsiderable influence on the drama of their time, for many plays were written for certain players, and especially many for particular actresses, who, in the plaudits of the crowd, enjoyed that transient glory which is the coveted reward of the highest as well as the humblest of their class.

THE ARCHITECTURE OF JAPAN

By Warren P. Laird

Professor of Architecture.

In the field of painting and the minor arts Japan is freely accorded high rank among the nations of the earth but for some reason we virtually deny that she has an architecture. This is reflected not only in the opinion of the tourist but also in the extended literature with which the world shows its interest in the history and culture of this remarkable people, for with one exception there is hardly a book that betrays any appreciation of the quality and value of this phase of the art of Japan. And this exception is so remarkable for its insight and understanding that, having used it as guide and revealer in a tour of Japan I shall here employ it freely, even at the risk of making my lecture largely an exposition of its content. This book, entitled "Impressions of Japanese Architecture and the Allied Arts," is the work of the distinguished American architect, Dr. Ralph Adams Cram.

Let me, however, introduce the subject by a presentation of contrasting views, citing first the more general, as voiced by Professor Chamberlain of the Imperial University at Tokyo, a man of long residence and wide observation in Japan. Professor Chamberlain observes in his entertaining and invaluable notes entitled "Things Japanese" that;

"The Japanese genius touches perfection in small things. No other nation ever understood half as well how to make a cup, a tray, even a kettle—a thing of beauty, how to transform a little knob of ivory into a microcism of quaint humour, how to express a fugitive thought in half-a-dozen dashes of the pencil. The massive, the spacious, the grand, is less congenial to their mental attitude. Hence they achieve less success in architecture than in the other arts. The prospect of a Japanese

city from a height is monotonous. Not a tower, not a dome, not a minaret, nothing aspiring heavenward, save in rare cases a painted pagoda half-hidden amidst the trees which it barely tops—nothing but long low lines of thatch and tiles, even the Buddhist temple roofs being but moderately raised above the rest, and even their curves only quaint and graceful, nowise imposing. It was a true instinct that led Professor Morse to give his charming monograph on Japanese architecture the title of "Japanese Homes," the interest of Japanese buildings lying less in the buildings themselves than in the neat domestic ways of their denizens, and in the delightful little bits of ornamentation that meet one at every turn * * * ."

In contrast with this opinion is that of Dr. Cram, who observes that the architecture of this people, "when once it is known, becomes a thing of extreme beauty, dignity and nobility, immensely significant, profoundly indicative of the fundamental laws that underlie all great architecture."

Now, if the first view is correct, Japan, with its high civilization, its mastery of the major and minor arts and its world leadership in certain of them, Japan the artistic, has utterly failed in Architecture, that Mother of the Arts! In this respect then the Japanese must have remained primitive; æsthetically stagnant; the one race whose ethnic development has broken the universal rule which makes the architecture of any people the surest proof of their culture.

But the first view is not correct, either as to Japan or the nature of architecture. Its error lies in the assumption that the latter cannot exist without buildings of great magnitude or striking height; whereas, whether in Europe or the Orient, many of the best examples of the art are modest in dimension. It is not surprising therefore that a conception based upon the quantitative rather than the qualitative standard should have diverted this author, as it doubtless has many others, from the architecture of the country to the construction of its buildings in their most familiar form—the domestic house.

No, and emphatically, Japan, the land of consummate art, has an architecture of the truest character, worthy to be placed

with that of any age or country throughout the world. The very general and honest denial, to the Japanese, of a worthy architecture, is due simply to the failure to see it—not to its non-existence. And the failure to see arises from the simplest of causes,—the failure to understand the language spoken, that is to say, the terms in which the art is expressed; or, in other words, the manner in which the underlying principles of architecture are wrought out in their Japanese form, so profoundly unlike our own.

For it must be remembered that Japan requires *interpretation* to our Western minds. Her people and their ways are utterly different from our own; her habits of thought are the antithesis of ours and naturally the expression of those thoughts, whether in language, manners or art, must take a form strange to us. This form will have no meaning to us until we analyze it in the light of fundamental principle. Then we find that this apparently singular people are the masters of every art, their productions differing from ours in the form of expression rather than in essential merit—save where, as is often the case—they excel us in merit.

When, as travelers, we first enter the Orient, and especially China and Japan, everything seems not merely curious but bizarre, fantastic and unreasonable. Customs seem singular, methods inconvenient and the whole world topsy-turvy. This constitutes its fascination to us as tourists but would repel us if we were obliged to spend our lives under its conditions. If, on the contrary, we could see ourselves and our Western civilization with the eyes of the Orient we would receive precisely the same impression, exactly reversed. Our world to them is strangely inconsistent, full of meaningless forms and useless action, perverted in its impulses and incomprehensible in its sum total. We are all familiar with the interesting contraries that exist in mechanical methods between Japan and Europe—as for instance, in the use of the carpenter's plane, which with us is pushed from the operative and with them drawn towards him. "Why is it," asked a perplexed Chinese lady of an English writer, "that Europeans do so many things in an

unnatural way?" Each sees in the other only that which differs from the familiar and it is only when this strangeness wears away and the underlying grain of universal human nature shows itself that we realize the difference to be superficial and the actual character of the people to be true to nature and their works true to the laws of art.

These surface differences, found in manners and customs, in literature and art and in every manifestation of every people, are merely the conventional forms through which expression is given to their conception of the truth. This is especially the case in art, where the conventionalizing of natural forms, to retain their essence while adapting them to the limitations of material and position, is an essential process. In none of the arts is convention more binding than in architecture, albeit in every land and age its conventionality takes a different form while its fundamental laws remain the same.

Let us for a moment consider these conventions, or modes of expression, in our own architecture, taking the Gothic cathedral as an illustration of Anglo Saxon genius and religious aspiration. Every part of this wonderful structure, from minute detail to lofty vault, is eloquent of the faith and devotion which wrought it out of senseless stone. *We* understand it because we understand the language in which its message is conveyed. Its symbolism and its every line and ornament have an age-long familiarity to our race. But to the Buddhist what can it mean? Nothing more than his temple means to us. To understand our art he must judge it by basic principles quite as must we in an effort to appreciate *his* art. Again, classical architecture, although a household word with us, explains less clearly its symbolism, as expressed by its ornament and other conventions, because their origins have been lost in antiquity; yet we accept and blindly copy those forms because of their familiarity to our Western thought. To go back still further toward the sources of common origin, how little do we feel of the real meaning of Egyptian symbolism, yet the architecture which presents it is to us far more intelligible than is that of the Orient.

Now, underlying the actual forms which have become so conventionalized in all architectural styles, lies the real architectural quality, as shown in their obedience to the laws of construction, the demands of usage and the call for good proportions and fitting ornament; attributes so often lost sight of in contemplation of surface characteristics. And the architecture of Japan is a full counterpart of the best architecture of Europe, observing the same underlying principles but clothing them in its own garb, as strange to Western eyes as is that of our architecture to Oriental vision.

I must beg a little further to test your patience, before entering upon a detailed discussion of the building art in Japan, with a brief summary of these underlying principles. Otherwise it will be difficult to find a common ground for the comparison of Eastern and Western architecture or a just means of understanding the former.

Three properties, then, are essential to architecture, without which it can have no real existence. These may be summarized as stability, utility and beauty.

The first means endurance: resistance to natural disruption and decay and to the violence of man. Stability frequently requires that a fabric shall support great loads over vast spaces and always demands the careful adjustment of materials to the strains imposed upon them. Ruskin well says that not only can there be no architecture without building but no *good* architecture without *good* building. The fact that we commonly speak of architecture as the "building art," shows how essential to it is structural integrity.

The second quality may be phrased as "convenience"; or the adaptability of the structure to its purpose. Its several rooms and other parts must be so shaped and arranged as to afford the maximum facility in their use. The most careful adjustments must be made in the plan or the whole internal economy of the building will be defective. This attribute of convenience, usually taken for granted by the observer as though it happened by accident, actually consitutes a more

severe tax upon the ingenuity and inventive power of the architect than does any other phase of the designing of his building.

The third factor, beauty, needs no advocacy, for we cannot conceive of architecture without it. It may be manifested in the nobility of the mass or the justness of its proportions; in purity of line, appropriateness of ornament, and harmony of color. However these qualities may be manifested, we must expect the building to display them if it be worthy to be rated as an example of good architecture.

Now to turn to Japan, we find that its best epochs are marked by buildings perfectly meeting these three prescriptions, in their most exacting applications. We find an architecture which first, is absolutely true in its obedience to the laws of construction where ours, too often, is not; second, recognizes primarily the practical uses which called it into being wherein too often we fail; and lastly, whether in proportion, line, ornament or color, is nowhere in the world's history to be excelled and seldom to be rivalled in respect to absolute beauty.

Before proceeding to details, I will ask your attention to a brief outline of the art history of Japan and a reference to its geographical position.

We are accustomed to regard the Japanese as an isolated people, only recently admitted to the family of nations. But prior to the seventeenth century, when her gates were deliberately closed to the world, Japan, for some 900 years, was open to all the currents of foreign influence then flowing through the Orient. Thus she had free communication with China and Korea, and contact with traders and missionaries from Portugal and Spain. Her history, when clearing the mists of antiquity, shows her with a well defined although primitive civilization at the beginning of the seventh century, when Buddhist missionaries invaded the island, introducing a new faith destined to thrive amicably side by side with the native Shintoism or ancestor worship and incidentally carrying to a congenial soil the seeds of the arts of China.

Manifestly this then young and eager people were prepared to seize upon, absorb and translate into terms of their own, every suggestion that might drop from an older people, ripened as were the Chinese in all the fine arts. For the latter, as we too seldom reflect, have passed through ages of development, in painting, sculpture and architecture, in literature and philosophy, that are no less notable than the Renaissance of Europe but which antedated it by centuries.

Under the stimulus of this contact with a ripened civilization, the reaction of the Japanese was singularly like that of the early Greeks to the influence of their older neighbors to the South and East. Fresh and eager in appreciation, yet with intense self consciousness as an independent people, they seized upon the forms and motives of the older civilization and transmuted them into a new and vital art, expressive of national character and charged with a new beauty and significance.

The Buddhist propaganda, proceeding from China and carrying such profound consequences to the æsthetic life of Japan, reached that country by way of Korea and a glance at the map will show the comparative ease with which this peaceful invasion must have been effected.

In their historical development the arts of Japan, as cited by Mr. Cram, display four periods of activity and divergent character which group broadly as follows:

"*First.*—The Chinese and Fujiwara, 600 to 1100 A. D., marked by great excellence in sculpture, poetry and architecture.

"*Second.*—The Kamakura, 1100 to 1400, in which architecture alone retains and even advances its merit.

"*Third.*—The Ashikaga, dating from 1224; marked as the golden age of art, in which painting gains ascendancy, with sculpture and the industrial arts close rivals; and,

"*Fourth.*—The Tokugawa; inittated with the Shogunate of that name in 1603 and continuing to the invasion of foreign influence in recent times. In this period, while architecture is decadent and painting suffers from realism, a marvelous

development takes place in architectural decoration and the minor arts."

We may now turn to an examination of the architecture of these several periods, remembering that it passed, although not concurrently with the other arts, through the several stages of development, perfection and decay inherent in all human work.

The monasteries of Horiuji, Yakushiji and Horinji, near Nara, present an architecture that is at once the earliest and best to be found. Singularly enough they are little known to the tourist, although virtually in the environs of Nara, which is one of the show places of Japan because of its temples. But this is significant of the general tourist attitude, clearly shown in (and perhaps partly formed by) that admirable guide, Murray's Handbook, which refers to this more ancient locality as of interest to "the student of early Japanese art," treating the buildings merely as receptacles of the objects to be studied.

Mr. Cram says of the Horiuji and neighboring groups:

"Previous to the reign of the Empress Suiko in the latter part of the sixth century, Japan was a comparatively barbarous state, but the mixture of Tartar and Malay blood had resulted in a race that was waiting only for the impulse that should start it on its career of greatness. The ethnic religion was a primitive cult of the dead of which the modern Shinto is a somewhat artificial restoration. It was impotent of the highest spiritual good, and when the revelation of Buddhism burst on the people of Japan, an entire race rose suddenly into splendid action. Buddhist priests and monks came from Korea to the waiting nation, and with them, at the instigation of Prince Shotoku, came architects, sculptors, and scholars. Nara became the capital: in a few years the monastery of Horiuji was built by Korean architects, and of this first great work of art on Japanese soil, the Kondo, Go-ju-to and Azeku-no-mon still stand, priceless records of the birth of a great nation."

"In style they are purely Korean, or rather Chinese, of the Tang dynasty, for the civilization of Korea was that of Chinese

Buddhism, and it is doubtful if any material change had taken place in its acquired architecture, though a distinct refinement was visible in the great school of Korean sculpture that was now to make possible in Japan plastic art of the most notable and supreme type."

"This Korean or Chinese architecture was, at the time of its advent in Japan, a style that was almost perfectly developed; in simplicity and directness of construction, in subtlety and rhythm of line, in dignity of massing, in perfection of proportion and in gravity and solemnity of composition, it shows all the evidences of a supreme civilization; as must indeed have been the case, for at this time, the last quarter of the sixth century, China was, without doubt, the most perfectly developed and most nobly civilized of the then existing nations of the earth.

"This group of buildings—gate, temple, and pagoda—is the most precious architectural monument in Japan, indeed in all Asia, for it not only marks the birth of Japan as a civilized power, but from it we can reconstruct the architecture of China, now swept out of existence and only a memory. And its artistic value is no less; small as they are, these buildings are almost unequaled in Japan for absolute beauty, and they have remained the type from which all the architecture of the nation has developed.

"The Azeku-no-mon, or Middle Gate, remains as it was first built; the lower galleries of the Kondo and Go-ju-to date only from the sixteenth or seventeenth centuries and grieviously injure the proportions of the ancient buildings, while the angle supports of the upper roof of the Kondo are of the Tokugawa period, and are also unfortunate. In spite of these additions the extraordinary grace and refinement of the work compel the most profound admiration; and at first it seems as though there were nothing more for Japan to do in the line of development, so perfect seems this architecture borrowed from China and Korea; yet further development was possible as we shall see later.

"These three buildings form but a small part of the enor-

mous monastery of Horiuji, but they are the only ones that unquestionably date from the beginning of Japanese civilization. The whole forms a good model of the early Buddhist monastery, with its central group of temple, pagoda, and lecture-hall, standing in the midst of a vast, covered kwairo or cloister entered through the great two-story gate, its subordinate shrines, temples, and halls, and its adjoining street of houses for the priests and monks. Apparently the style of the original work has been most carefully followed in all rebuilding, and though the cloisters, and all the subordinate buildings, are only a few hundred years old, they are, in all probability, perfectly reliable models of the early Korean work. The general plan is noble and dignified, and the grouping and composition consummately delicate, though everything is on a much smaller scale than in many of the more recent monasteries around Kyoto. The temples contain treasures of sculpture that cannot be equalled elsewhere in Japan, while the Kondo shows on its walls remains of most extraordinary mural painting that make clear the curious combination of influences that governed the art of China and Korea in the seventh century. This is much more evident in the sculpture of the sixth and seventh centuries than in any other form of art, but these singular wall decorations show plainly the powerful influence of India, and even that of the decadent classic of Asia Minor; the only absolute trace of this latter quality as it was shown in architecture is the entasis of the columns of the great gate, used here, I believe, for the first and only time.

"Next in date to the work in Horiuji is the San-ju-to, or three-storied pagoda of Hokiji, not far from Horiuji, and dating from the year 646. In detail this very beautiful little structure is identical with those at Horiuji, and must either have been built by Korean architects, or (more probably) Japanese, who dared not vary a hair's breadth from the perfect model. The vertical dimensions are a little greater in proportion to the width than at Horiuji, and as this is directly in line with the future development of the style, it seems quite possible that this is the work of Japanese architects, and if so the

first existing in the country. At the ruined temple of Horiuji, also close at hand, is another three-storied pagoda, the vertical proportions of which are still further drawn out, with yet greater lightness of effect.

"Still nearer the present shrunken city of Nara lies the temple of Yakushiji, and here we find a pagoda that is not only unique, but, as well, one of the most beautiful structures in Japan, and also the first undoubted work by a native architect. If the prototype of so revolutionary a structure existed in China, we can never know, but as this triumph of imagination dates from the year 680, a full century after the coming of the Korean architects, and as it is full of characteristically Japanese features, we are, I think, justified in accrediting it to native genius, particularly as its date corresponds exactly with that of the highest level reached by the first great school of purely Japanese sculpture.

"This pagoda of Yakushiji is one of the most daring, original and yet successful works of architecture of Japan; nothing of the delicacy of line, frankness of construction, subtlety of proportion so characteristic of Horiuji is wanting, but in place of the severe and classic masses of the Korean work is an aspiring lightness, a captivating grace that only find a parallel in the mediæval architecture of Europe. And yet this consummate achievement was the work of a people separated by hardly more than a century from practical barbarism, and it had already stood five hundred years when Europe emerged from the dark ages and first began her tentative efforts at building a new civilization and a new art.

"The pagoda of Yakushiji marks the birth of national Japanese architecture; in it may be discovered the germs of its future development; loftiness and varied grace in place of the sombre severity of the Chinese model, daring originality, richness and elaboration of detail. Here, for the first time, we find the doubled brackets that were to develop into the splendid system of the Kamakura and Ashikaga periods and ultimately fritter themselves away in the trivialities of the Tokugawa regime."

A later phase of this first period is exemplified in a structure at Uji, the Ho-o-do or so-called "Phoenix Hall" of the temple of Byodo-in, a work of the eleventh century and the best remaining example of the Fujiwara period. Cram says:

"No description and no photograph can give any idea of the almost inconceivable grace and dignity of this unique building. It is in the purest palace style and consists of a central shrine approached from the rear by a long, enclosed corridor, and with open two-story arcades terminating in low pavilions, reaching out on either hand. In delicacy of proportion and refinement of composition it marks the culmination of Japanese architecture; the coming centuries were to see structures of far greater size, grandeur, and dramatic quality, but in no instance were they to approach this "Phoenix Hall" in all that makes for refinement and classical perfection.

"Exquisite as this building is from without, one must go inside to learn of the splendid gorgeousness that characterized the work of the Fujiwara period; ruined by neglect and inevitable decay, it yet remains beautiful in line, detail and design. In the days of its glory it must have been a marvel, for all the woodwork of the wonderfully carved and coffered ceiling was covered with black lacquer inlaid with ivory, mother-of-pearl, and silver, while all below was gilding and polychromatic decoration.

"These, then, are the three temples from whose few remains we must learn all that we can ever know of the architecture of the first five centuries of Japanese civilization, Horiuji, Yakushiji, and Byodo-in. Carefully studied and without Western prejudice, they will be seen to indicate inevitably the existence in Japan of a system and school of architecture quite worthy to take its place with the already recognized schools of classical, mediæval, and Renaissance Europe."

After the Fujiwara period came a perceptible lowering of quality, yet the succeeding or Kamakura period displays work of great merit, as for instance, in the palace type of Kinkaku-ji and Ginkaku-ji and the Zen temples, exemplified at the

monasteries of Obaku-san, near Kyoto. Regarding the two former our author tells us that—

"As both these delicate little structures were originally but garden pavilions it is possible that they do not exactly represent the more dignified work of the time, but they certainly bear a close resemblance to the Chinese palaces as they are recorded for us in the screens painted by the great artists of the age. The grandeur and dignity of the Fujiwara Kyoto style has given place to a lightness and grace that are very charming. Originally one of these pleasure pavilions was entirely covered with gold leaf, the other with silver, and in this gorgeous innovation we find the first indication of the tendency that was to reach its climax under the Tokugawa."

Of the next or Ashikaga period we shall consider but a single example, the temple of the East Hongwanji, at Kyoto, typical of the constructions of the Shin sect of Buddhists, who continue even in recent times to build in this manner. Of these it is said—

"That in their largeness of parts, their grandeur of proportion and their reliance on carving for their decoration, they hark back to the reserved work of the fourteenth and fifteenth centuries. The Hongwanji temples serve to show the grandeur, even the sublimity, of these mighty structures. The great gates in this particular style are perhaps the most noble of all the different buildings. It really seems as though the perfection of composition, the subtle relation of parts and rhythm of line, had been achieved in these monumental gates."

Of the productions of this period our authority says,—

"More than any other of the Japanese architectural styles this development of the Ashikaga model seems to be the perfect translation into visible form of the spirit of Japanese feudalism and the equally perfect development of structural form from the qualities of the natural environment. The connection between these brown and gray temples and the forests and fields, rocks and rivers and mountains, is intimate and exact; as the castles and abbeys of England blend with

her landscape and her air, as the nacreous palaces and shrines of Venice grow out of the opal sea, as the hot sandstone fortresses of Hindustan rear their blistered walls from the desert sands, or the marble miracles of tomb and pleasure house flash above still pools and in the midst of tropical gardens, so, and with equal intimacy, do these brown and weathered temples rest in the purple shadow of gnarled cryptomeria or lift themselves from the shoulders of deep-wooded hills. With infinite craft, priests and artists and gardeners have wrought a perfect setting for their shrines, raising ramparts and terraces, training the willing trees into strange architectural forms, blending the whole as a painter blends his colors, composing the lines and masses as he builds his pictorial masterpiece."

In the final or Tokugawa period we shall find a decay in architectural form—the "Rococco period" of Japanese architecture as it was characterized to me by the Professor of Architecture in the University of Tokyo—redeemed in a measure by a wonderful development of decoration. This hectic evidence of final dissolution is well characterized by our authority in his treatment of its two phases. The temples most seen and accepted as typical by the tourist are those of this, the Tokugawa dynasty. Yet the refined beauty of the Horiuji and Yakushiji structures is so great by comparison that—

"In them one sees at once how unjust must be a judgment of Japanese architecture founded on the shrines of Shiba and Nikko, and the crowded temples of the Tokugawa period that rise in every village in Japan. In every detail the early work has been coarsened and vulgarized; the low roofs with their wonderful curves have risen to gigantic sweeps of blue tile, steep, coarsely curved, and loaded with huge ridges; and bracketing has become a wilderness of tortured carving and joinery, tedious and overloaded; ornament is no longer constructional, it is arbitrary, and by its very prodigality it becomes cheap and tawdry."

With respect to the ambitious group at Nikko, with its

lavish color dramatically staged against the bronze green background of cryptomeria trees; "One is apt to be blinded by its extravagance to the actual shortcomings of its architecture; but once strip it of its carving, its lacquer, its gold leaf and polychromatic decoration, and compare it in detail with the work of the Korean period, or even of the Fujiwara and Ashikaga, and it is easy to see how great has been the fall: the roofs are heavy and often coarse in their curves, the roof ridges and ribs have become enormous, crude and meaningless, the bracketing is fantastic and irrational in its intricacy and has lost the last structural excuse. Above all, the following of the lines, the curve composition, is no longer inevitably good. In the work of the Nara and Kyoto period one may view a building from any point and by some magical power the architect has so composed his curves that there is not a discord, a lack of rhythm anywhere. Under the Tokugawa this is no longer true, and one is constantly shocked at some violent discord in the composition of line."

But the decorative achievements of this period are of the very highest order, for—

"Leave out the question of pure architecture and the Nikko shrines, together with those of Shiba and Uyeno in Tokyo, are marvels of exquisite art. The decoration is masterly, the dramatic and pictorial effect triumphant, but it is the triumph of prodigal decoration, not of architectural achievement."

"Internally the Tokugawa temples are less susceptible of adverse criticism, many of them, like Chion-in and Nishi Hongwanji in Kyoto, being models of religious grandeur and solemn splendor. In this respect, as examples of interior decoration, the Nikko shrines and those at Shiba may be placed beyond criticism. Every period in Japan has had its fitting artistic expression, sculpture, architecture, religious, historic, and genre painting, and decoration, and the last is the true manifestation of the Tokugawa Shogunate."

Mr. Cram continues to say that—

"Apart from St. Mark's in Venice and the Capella Palatina in Palermo, I know of no religious interiors that can vie with

such caves of glory as Chion-in. Words simply fail when an attempt is made to describe the unparalleled splendor of such temples. Black lacquer and gold and cinnabar; chiseled baldachinos of exquisite metal work; massive ropes and tassels of blood-red silk; censers of gold and silver bronze; great lotus plants sheeted with beaten gold; vestments of stiff brocade heavy with massed embroidery; deep-tongued bells, sonorous drums; strange, unearthly chanting of tonsured bonzes; clouds of pale incense—it is all like some vision out of the mysterious, intangible past, aloof, unapproachable."

But the religious buildings of Japan do not constitute its full inventory of architectural examples, for there are also great castles and splendid palaces, those imposing domiciles of the feudal establishments of royalty and nobility.

Yet the fidelity of the Japanese to truth in architecture; their sensitiveness to beauty and unerring good taste are nowhere more clearly in evidence than in that humble building unit—the domestic house. To us comfortless, at least in cold weather and inconvenient at all times, it yet suits the needs of the people who build and live in it and so must be accepted as theirs—the true standard of practical values. As to its æsthetic character—an indispensable attribute of architecture—allow me to ask your attention to the opinion of the author I have elsewhere so freely quoted:

"For the courtesy and simplicity of Japanese home life, the domestic architecture forms a faultless setting. It is absolutely frank and straightforward in construction, perfectly simple in its forms, and reserved and refined in its decorations; all the ornament is rigidly constructional, while the furnishings are of the simplest quality and only such as the nature of the life demands. There is no ornament for the sake of ornament, no woodwork or carving not demanded by the exigencies of construction, no striving for picturesque effect through fantastic irregularity, no overloading of unnecessary decoration, no confusion of furnishings, no litter of trivial and embarrassing accessories. The spirit of ornamented construction and no other ornament whatever that characterized Greek architecture

finds its echo in Asia. As a result the effect is more reserved, refined, gentlemanly, almost ascetic, than is to be found elsewhere. No greater contrast to our own fashion could be imagined. With us the prime object appears to be the complete concealment of all construction of whatever nature by an overlay of independent ornament. With wainscot and marble and tiles, plaster, textiles, and paper hangings, we create a perfectly fictitious shell that masks all construction and exists quite independently of it.

"We pile up our immutable little cells in superimposed courses, cut narrow openings in the walls and fill them with flapping doors that are always in the way. We perforate the outer walls with awkward holes and fill them with plate-glass in order that we may gaze on a narrow back garden or a narrower street where nothing that is worth seeing ever occurs. With wainscot and drapery and paper hangings we strive for an effect of protection and then nullify it by our plate-glass windows that afford only garish light, and, in most cases, a view of things not worth looking at.

"As the result the rooms are chilly and without sense of protection in winter, and stuffy and oppressive in summer. The Japanese house is a revelation of the possibilities of exactly the opposite course. It is a permanent lesson in the value of simplicity, of modesty, of frankness, of naturalness in art."

Not alone in its furnishings but equally in its finish is the Japanese house the acme of simplicity and good taste. The chief structural material, always of wood, is itself exposed and beautified and all other materials, although required for practical use, are none the less chosen and treated with equal regard to their possibilities of texture and color.

As witness:

"To the Japanese, wood, like anything that possess beauty, is almost sacred, and he handles it with a fineness of feeling that at best we only reveal when we are dealing with precious marbles. For all wood that may be seen close at hand (except such as is used as a basis for the rare and precious lacquer) paint, stain, varnish, anything that may obscure the

beauty of texture and grain, is rigidly kept away. The original cost of material is a matter of no consequence; if it has a subtle tone of colour, a delicate swirl in the veining, a peculiarly soft and velvety texture, it is carefully treasured and used in the place of honor.

"The same respectful regard is shown towards plaster. With us of the West plaster is simply a cheap means of obtaining a flat surface that afterwards may be covered up in many different ways; with the Japanese plaster as an end in itself, and well it may be! We ourselves know nothing of the possibilities of this material. In Japan it has the solidity of stone, the colour of smoke and mist and ethereal vapours, and the texture of velvet.

"Wood and plaster: these are two of the four components of a Japanese interior, the third is woven straw of a pale, neutral green. This is for the inevitable mats that carpet all the floors. The fourth is rice paper; creamy white, thin, and tough, stretched over the white latticework that forms the windows and the outer range of sliding screens (shoji), or covering the thicker screens (fusuma), that form the dividing partitions of the room. Now and then these fusuma are covered with dull gold and faintly traced with dim landscapes or decorative drawings of birds and flowers, or else they are wrought with great black ideographs; sometimes the paper is faintly tinted, or varied by an admixture of delicate seaweed, but as a general thing, and except in a noble's "yashiki" or in some house of entertainment, the four materials remain: natural wood, tinted plaster, pleated straw, and rice paper.

"Not an ambitious collection of materials and yet for refinement, reserve, subtle colour, and perfection of artistic composition and ultimate effect, I know of few things to compare with the interior of a Japanese house.

"For the extreme reserve that marks the architectural forms is echoed in the furnishings; they are few and of the utmost simplicity, nothing appearing except such articles as are absolutely necessary and, inconsistent as it may appear with the common ideas of Japanese society, there is a certain

austerity, asceticism even, about the native character that reduces this list of necessities much below what would be acceptable to Western ideas. A number of thin, flat, silk cushions to kneel on, one or two tansu, or chests of drawers, andon, or lamps with rice paper screens, small lacquered tables a foot square and half as high for serving food, hibachi or braziers, several folding screens, a standing mirror of burnished steel, and dishes of lacquer and porcelain form the entire list, with the exception of cooking utensils and the beds that are rolled up and put away in closets during the day. Under ordinary circumstances, a living room, even of the best class, contains nothing in the way of furniture except what appears in the tokonoma and chigai-dana. Cushions are produced when the room is in use by day, beds at night, small tables when food is served, and a brazier if the weather is cold—this last apparently as a formality for it has no appreciable effect on the temperature. One would say that the result would be barren and cheerless, but this is not the case, every detail of form and colour being so exquisitely studied that the empty room is sufficient in itself. There is something about the great spacious apartments, airy and full of mellow light, that is curiously satisfying, and one feels the absence of furniture only with a sense of relief. Relieved of the rivalry of crowded furnishings, men and women take on a quite singular quality of dignity and importance. It is impossible after a time not to feel that the Japanese have adopted an idea of the function of a room and the method of best expressing this, far in advance of that which we have made our own."

Any treatment of the architecture of this country ought to include reference to the art of garden design, in which the Japanese excel. But time will not permit an excursion into this fascinating field. Its achievements would be found of a kind with those of its greater brother art of architecture, in short, such as to give this remarkable people a place of equality with the world's masters in garden composition.

But there is one phase of the architecture of Japan so wholly

separated from the rest that I have withheld it to the last, yet so inherent to the race that it cannot be omitted. I refer to the temples created by and dedicated to the perpetuation of Shintoism; the native and primitive faith; a species of "mythology and vague ancestor and nature worship."

These buildings, of which the most notable are at Isé, preserve, it is believed, and display with näiveté, the essential structural character of the primitive Japanese hut. They may therefore be regarded as examples of original or native Japanese construction quite unaffected by Chinese and Korean influences, which under Buddhist propaganda wrought out the very beautiful type of architecture we have been studying. Of this archaic or Shinto style Murray says:

"A very ancient rule directs that the two great Isé temples, as also every minor edifice connected with them, shall be razed to the ground and reconstructed every twenty years in exactly the same style, down to the minutest detail. For this purpose there are two closely adjacent sites. The construction of the new temples is commenced on the vacant site towards the end of the period of twenty years; and when they are finished, the ceremony of Sengyo, or Transference, takes place, the sacred emblems being then solemnly and amidst a great concourse of pilgrims removed to the new buildings from the old. These are forthwith pulled down and cut up into myriads of charms which are sold to pilgrims. * * * The immemorial antiquity of the Isé temples is therefore only the antiquity of a continuous tradition, not that of the actual edifices."

Turning then, in conclusion, to our subject in its broad aspects, may we not accept the verdict of the architect whose findings I have so fully quoted and who, by his exposition of Japanese architecture, has revealed to us an art of great nobility and beauty? This verdict is expressed in his conviction that—

"Carefully analyzed and faithfully studied, Japanese architecture is seen to be one of the great styles of the world. In no respect is it lacking in those qualities which have made

Greek, Mediæval, and Early Renaissance architecture immortal: as these differ among themselves, so does the architecture of Japan differ from them, yet with them it remains logical, ethnic, perfect in development.

"In one respect it is unique: it is a style developed from the exigencies of wooden construction, and here it stands alone as the most perfect mode in wood the world has known. As such it must be judged, and not from the canons of the West that presupposed masonry as the only building material. Again, it is the architecture of Buddhism, and it must be read in the light of this mystic and wonderful system. Finally, it is the art of the Orient, taking form and nature from Eastern civilization, vitilized by the "Soul of the East," the artistic manifestation of the religion of meditation, of spiritual enlightenment, of release from illusion. It is separated from the art of the Western religion of action, of elaborate ethical systems, of practicality, by the diameter of being."

PARTICIPATION OF TEACHERS IN THE ADMINISTRATION OF SCHOOLS

By Harlan Updegraff

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In common with many other elements of our political and social life the administration of our public schools is hardly beyond the early stages of its evolution. Previous to the late Civil War it had been determined that our schools should be free and that they should be administered through Boards of Education, which should have the full responsibility for the control of the schools in accordance with the laws of the State subject to the check of the people in each community as expressed in the regular elections. It was not until after the Civil War that the large growth of cities on the one hand and the enactment of compulsory education on the other produced the great city school system of today and in consequence the large administrative problems involved therein. Concomitant with these movements we have had the development of the science of education and great improvement in the training of teachers including the expert in school management and school administration. The lay superintendent of the earlier period has been transformed gradually into the expert engineer.

The administrative relationships between this expert and the Board of Education and through the Board to the people were slowly worked out before the opening of the recent world war and the rules and regulations of many of our city school systems were shaped in accordance with those principles which were recognized as most fruitful for the efficiency of the schools. They had not, however, been given the permanence and stability which necessarily comes with their enactment into the laws of the states.

The fourth personal factor in the scheme of school administration, namely, the teacher, had not before the war received the attention that it should by way of giving it a place in the management of schools, altho forerunners of the new era have appeared in a number of places. It remained for this world conflict to bring forcibly to the attention of the teachers themselves and also of the people the problems that are involved in the determination of the relationships of teachers to each of the three other factors—the expert or superintendent, the school board, and the people.

Our public schools are intended to serve the ends of society in the education of children. Ideally, they serve the needs of individuals by giving every child that education which is best for him, but if as a matter of fact, service were the main spring of action, few difficulties would arise in their administration.

Unfortunately, perhaps, the running of schools requires money. And the better the service the more the money needed. In consequence, throughout our entire land we have a clash between two opposite parties in the administration of schools—the liberal progressive, which supports the view that the schools should be made to render the largest possible service to society by affording the best means for individual development, and the conservative party which believes in restricting the schools to the narrowest practicable limits. It is the appearance in another form of the world-wide clash of ideals which we are now so keenly expressing in the commercial and industrial world—service vs. profits, and which has been pointed out by the expert in industrial and commercial management, H. L. Gantt, in his recent monograph on Organizing for Work. Some enterprises, on the one hand, take pride in the service they render the public and seek to extend it and improve it, asking only a reasonable profit; other firms make profits their first aim and endeavor to make them as large as conditions permit. Indeed they often refuse to render service badly needed by the public until the desired profit is forthcoming. This clash between profit and service

is becoming acute in our nation. Organized industry and business in pursuit of profits rather than service just now have the upper hand. Many persons think, unless they are brought under control and unless the owners of enterprises are led to realize that they have a social obligation which is superior to their selfish ends and that they must seek to render service primarily, and to develop it and to extend it and in return therefore receive a profit proportionate to the service they render, our country is very apt to experience in the next few years a social revolution which will be characterized by extreme action and great waste but which will put business and industry under such social control as will compel it to render service to the common good.

This opposition between service and profits has existed in the schools from the very beginning in the form of a struggle between service and taxes, which are profits in a negative form. The conflict for free schools continued over half a century or more. After it was legally established that the wealth of the nation should be made to pay for the education of the nation, the party opposed to rendering the service for the common welfare has sought to confine expenditures for schools to the minimum. The advocates of public education have had to fight their way year by year and although they have on the whole succeeded and although our public schools have during the past quarter of a century had a remarkable growth, nevertheless we have now reached another crisis in their history. The development of the social sciences, of psychology, and of education, the incoming of the education expert, the wider and deeper interests in social betterment among the masses of our people—all have set higher standards for the public schools. Greater service must be furnished in order to satisfy these demands, which the outcome of the war has established as not only just, but peremptory for the best interests of society; this means that larger amounts of money should be raised at once through taxes. Very often the same forces, which at times seem stronger than the Government, and able to exact what profits they choose are striving to

limit the taxes to such amounts as to prevent the schools from rendering adequate service. The struggle between the progressive school party whose watchword is service and the conservative reactionary party whose shibboleth is low taxes is in progress and should become even more intensive than at present. I have no doubt the result will be favorable to the ideal of service but just from what sources these taxes shall be secured and in what amounts, for taxes must be reasonable just as profits should be reasonable, and how teachers may be adequately paid, additional teaching and supervisory force provided, and new departments established constitutes one of the most important educational problems of today.

But the crisis in our public schools today is not wholly economic. The same democratic spirit which seeks to use the wealth of all in the form of taxes for the good of all likewise favors the participation of all in the control of enterprises in which each has a part. And just as the world war has brought out more clearly than ever before this struggle between profits and service so it has emphasized the struggle between autocratic and democratic control of enterprises of every kind. Just as in business and industry certain enterprises have had as one of their first aims the promotion of the well being and happiness of their employees and have, in some cases at least, provided forms of organization which permit their participation in management, and certain other enterprises have given little or no consideration whatever to the good of the workman or his opinion regarding the operations of the plant, so in the schools we have, on the one hand, examples of careful consideration given to the happiness and welfare of all employees and of their participation in management, and, on the other hand, cases in which teachers have received little regard either concerning their individual welfare or their value to the school in the shaping of its procedure. There are autocratic boards of directors and managers in schools as well as in business.

The parties in this two-fold crisis—economic and administra-

tive—naturally have common lines of differentiation. The man who is undemocratic in his attitude toward supporting enterprises for the common good and who seeks to conserve his wealth for himself tends to extend his individual control to the widest bounds and to oppose participation of others in control; while those who believe in the common support of public enterprises developed to the highest efficiency naturally tend to approve of cooperative control. The latter are promoting the ends of a democracy in producing the widest range of shared interests and social contacts; while the former are conservative, autocratic, reactionary, and oppose cooperative endeavors and favor the preservation of an order which leaves each to work out his own salvation.

It is in the welter of this two-fold social crisis that the teachers of the public schools now find themselves. Many different propositions have been submitted as possible ways for dealing with the situation, some of them reflecting vision, sanity and true patriotism; others are narrow, biased and selfish—unworthy of the profession of teaching.

Some managers of schools and boards of education have sought to allay the unrest by increasing pay, in the belief that if workers feel they are well paid, they will then follow directions. Some teachers, on the other hand, seek merely increases in salaries and are quite content to do whatever they are told and to do as little of that as possible. And oftentimes those that receive most, give least. It is also just as true that many managers of schools wish to secure large pay for their teachers but do not wish their advice and assistance in the management. We have had in the past few months many examples of abortive attempts to solve the existing situation due to a lack of understanding and appreciation of the principles of efficiency management, as well as of forces that are working irresistibly in the social life.

It is the administrative aspect of this two-fold crisis that we are to consider particularly today. While the economic is more immediate, it is not more important for the welfare of the schools. In fact they should both be solved in the light of

efficiency management. We cannot discuss in this paper what the pay of teachers should be, but it must be made plain that no management can be successful unless those who are employed receive an adequate compensation and in proportion to the service rendered.

What part should teachers take in the management of schools and through what organs should it be exercised? Upon what questions should teachers express opinions? To whom should these opinions be given? To what extent should they be subject to review or check? The answers to these questions are dependent upon a number of factors among which are the following. (1) The teachers themselves—their training, experience and ability in management (2) the ability of school principals in management (3) the efficiency of the superintendent and (4) the type of men on the Board of Education. But more important than all these is our conception of the aims of the school and the theory of management in accordance therewith which is adopted as basal.

The management of a school should aim: First, to attain in the most efficient manner, the best education of every child or adult that it admits as pupil for the good of himself and of society. Second, to accomplish this end through such instrumentalities as will promote among those engaged in the work, democratic ideals and practices. In other words, we must consider both the efficiency of the school for the making of an educational product and also the contribution that its management may make in the building up of a democratic society apart from the education of its pupils.

A theory of management should be based upon a scientific study of facts in management. The principles that have been worked out by students of management of industrial and commercial enterprises, and embraced in the developing science of efficiency furnish such a foundation for a theory of management in education, for the principles of efficiency seem to have universal application. I shall first set forth certain principles for the management of schools which while derived tentatively from this source, have been established as true for schools in a

study which has observed scientific method.[1] These will be followed by two principles derived from a consideration of the nature of democratic society made necessary by the second part of the aim just stated.

It is necessary to the highest efficiency of a school that as far as possible the fullest and most reliable available knowledge of every feature of it be taken into account in the determination of the policies, plans and methods as well as in their execution. This requires constant interchange of knowledge and experience from superiors to subordinates, and from subordinates to superiors, as well as among those of equal rank. No fact having a real bearing upon the work in hand should be withheld; nor is any person so competent that he cannot learn from any other person who has new experiences or knowledge in his possession. This means that the knowledge of the superintendent and of the supervisor should permeate every feature of the school system and govern, as far as possible, the activities of teachers. The actual conditions faced by every teacher should be known by the manager and by the expert and should determine in part their contribution to the control of the system in its general features as well as in its details. This interchange of experiences among teachers in order to get the best available knowledge and experience from those that have the actual instruction in hand, and between teachers and the more expert supervisors above them, is much more necessary in the conduct of the schools than in the management of an enterprise that is making a material product and which is surrounded by more constant conditions than is the school. The great variability and the unusual complexity apparent in every factor of the instructional process of every child make necessary the assistance of the expert to the teacher at all times as well as the communication to the expert of the daily experiences of teachers with pupils. New scientific investigations on the one hand coming in through the expert, new

[1] Updegraff, Harlan, Administrative Cooperation in the making of courses of study in National Educational Association Bulletin in Report of Committees on Superintendents' Problems.

difficult life-situations on the other hand coming in through the teachers—these need to be welded together. This combination of coöperative endeavor with freedom of exercise for the full contribution of each for the common end—the best education for each individual child—should extend for its full fruition to the widest practical bounds.

Efficient school management also demands that there be fostered a spirit of genuine loyalty to the school, from which will result the building up of an intense pride of membership in it, and the inculcation of high standards of workmanship and of mutual and cordial fellowship, so that infraction of rules and inefficiencies of work will be corrected thru a strong esprit de corps and without attention from superior officers. The participation of all upon a common plane in cooperative endeavors which will at the same time permit to each person equal opportunity to do his full part in the conduct of the school, is a necessary desideratum to the attainment of this principle. This combination of coöperative endeavors with freedom for exercise of the full contribution of each to the common good should extend for its full fruition to the widest practicable bounds, but first to those features with which each teacher is most intimately connected.

Another principle of very great consequence in the successful management of an enterprise makes necessary a thorough understanding between teachers and supervisory officers. It is necessary to the highest efficiency of an enterprise that the personal welfare and happiness of each worker, not only in the present but also in the future, be promoted in every practicable way. Not only should he be given the work that he is fitted to do but his capacity should be developed to do it in the best way. He should also be led to create and to see his own work in relation to the work of others. He should be satisfied that his life is developing satisfactorily in the right direction. This principle demands a study of the needs of the individual teacher and an honest, careful effort to promote his individual and professional welfare. Cooperative efforts in which superiors and inferiors work together promote the realization of this end.

The principles calculated to promote democratic government are two in number. The first adds nothing to those derived from the science of efficiency. Its statement under this head does, however, serve to emphasize its importance. The second principle, not ordinarily covered by efficiency engineers, is a very important one as will be observed later in our discussion. They are as follows: (1) Every enterprise should be conducted in such a way as to secure among its members the sharing of interests in as large a number and in as varied a degree as possible. (2) The greatest possible fullness and freedom should be given for the interplay of each group with other groups in society.

Let us now apply these principles in criticising those forms of participation of teachers in administration which have thus far appeared. These forms may be grouped under the following heads:

1. The informal or incidental consultation of teachers on the part of the superintendent or members of the Board of Education.

2. The regular or occasional formal meetings with teachers on the part of the superintendent.

3. The conferences with temporary committees of teachers formed for some special purpose.

4. Teachers' Councils.

5. Election of superior officers by teachers and membership of teachers on boards of education.

It seems unnecessary after stating these principles to make any extended comment regarding that form of management which uses teachers but little or not at all in the determination of policies. It cannot be emphasized too strongly that the desire to create things that play a real part in the social life must be satisfied in order to make happy, contented and efficient workers. The very nature of teaching strengthens this impulse. It is really an anomaly that in county and city institutes we find teachers do not want to do more than listen passively. Of all vocations teachers should be among the most creative workers. While the fact that they are not is due to

other reasons as well, nevertheless the failure to call upon teachers to assist in making better schools is a real cause. It is a remnant of the old autocratic regime which, however common it may still be among business enterprises that have profits as their primary aim, has no part in the management of a superintendent who considers service as the aim of the school. To the extent that he excludes teachers he is a reactionary and in the way of progress both of the school and of society in general. But few schoolmen wish to have such a taint and since cooperation has been proven so successful in the making of courses of study, the per cent of superintendents who do not use some cooperative plan—about 47 per cent—will doubtless soon be rapidly reduced.[1]

The regular or occasional formal teacher meetings enable the superintendent to get such opinions and experiences from the teachers as they may desire to express in the teachers' meetings. Their efficiency as instruments for getting a true knowledge of situations has been very limited because of the hesitancy of teachers to express themselves frankly in such meetings. Their failure to achieve worthwhile results both in the opinion of superintendents and of teachers themselves has brought this agency of school administration into considerable disrepute. Teachers so often regard them as a means for the superintendent to impose upon them his will or as a means of improving them in ways in which he may desire irrespective of their interests in such a procedure.

Exceptions have occurred in few of smaller cities, where series of teachers' meetings were conducted as deliberative assemblies giving extended and detailed attention to problems under leadership that called forth freely and fully personal opinions and experiences and resulted in the definite expression of conclusions in some organized way. Such meetings are valuable agencies for administrative purposes. Under these circumstances, however, they really become

[1] Updegraff, Harlan, Administrative Cooperation in the Making of Courses of Study in the Elementary Schools. N. E. A. Bulletin, 1919.

committees of the whole and are virtually like the committee as it exists in the larger cities.

The extent to which teachers participate in the management of schools through committees depends upon a number of factors. Among the most important of these are—First, whether the members of the committee alone join in the deliberations or whether there are subcommittees composed in part or entirely from outside of the membership of the committee itself, or whether the members are expected to get advice from all of the teachers in a certain grade or some other division of the school; second, the authority appointing the committee—whether the superintendent, supervisors, and principals or the teachers themselves; third, the number upon the committee; fourth, the definiteness of the action taken by the committee; fifth, the extent to which the supervisor, superintendent or board revises and amends the work of the committee; sixth, the number of committee meetings held, the extent to which the superintendent participates, and the manner in which he participates as well as the aim and character of the advice received from him orally, through reading of references given by him, or in some other way. All of these enter in to determine the extent of the participation of teachers in the administration of schools.

In case a superintendent appoints the teachers, especially when supervisors and principals are represented in large numbers upon the committee, or when he largely controls the deliberations in one way or another, or revises freely what the committees do, the extent of the participation of teachers is not large. In instances when the superintendent depends upon committees of principals entirely, as in the revision of courses of study, in our two largest cities—New York and Chicago—the part that the teachers play becomes almost negligible except when principals, perchance, depend upon the teachers for the work that they do, which is not likely unless the superintendent strongly insists upon it, as appears to have been true in the revision of courses of study in East Orange, N. J.

The procedure in New York is given as follows in a letter from one of the departmental heads:

"The board of Superintendents has a standing committee which considers all matters relating to courses of study. Any changes in the course of study are submitted by this committee to the Board of Superintendents, which in turn makes its recommendations to the Board of Education. A new course of study is generally adopted as a tentative course, put into operation in the schools for one year, at the end of which time suggestions and criticisms are submitted by teachers, principals, supervisors, and district superintendents. The course is then modified to meet these suggestions and is then finally adopted."

In Chicago the control of the superintendent over the course of study seems even more complete, although the form of organization for revision extends out farther from his office. His statement reads:

"There was a committee for each of the major subjects of the curriculum. Each of the committees worked under a district superintendent as chairman. They worked about four months. Each committee covered all grades in its subjects. The committees were made up mainly of principals. A few teachers were added. As the committee met during school hours it was difficult to put a large number of best teachers on the committee. Revision was made by the Board of District Superintendents as a whole, sitting as a body. Teachers, as such, contributed a very small part. The large contributions of content and suggestion were made by the principals. The final revision and form was made by the superintending staff under the direction of the superintendent. In this way, it may be said that the Superintendent was responsible for the whole course of study."

It is also stated that the modifications made by the Board in the courses submitted to it were large, that teachers had no opportunity to revise any of the courses and that they were not supposed to depart from them at all in their teaching. That Chicago is the heart and center of the American Federa-

tion of Teachers is not surprising. It is the natural result of such a regime.

The Superintendent of East Orange while preserving the usual course of administrative action through his cabinet of principals, also placed upon his teachers, selected by their principals, real responsibility in the making of the course of study and also worked with them.

The nine elementary principals were divided into committees. These committees worked directly with the Superintendent. Each committee associated with itself committees of teachers, divided into a primary group and a grammar group, recommended by the principals of the several schools. There was one delegate from each school, two teachers one primary and one grammar. They met with the committee of the particular subjects in question. As soon as any portion of a syllabus was ready it was discussed by the committee of principals and then presented at a meeting of all of the principals for discussion and adoption. It took somewhat over a year for this process. When the entire work was finished, it was approved by the principals and adopted by the Board of Education.

Decatur, Illinois, furnishes an example of a city in which committees on each school subject were appointed by a general committee with practically all the teachers serving upon some committee. The Superintendent worked with the general committee but reserved his power of independent action. Superintendent Engleman describes their procedure as follows:

"About three years ago we revised our whole course of study. We spent approximately one year upon it, during a portion of which time, indeed for two or three weeks the schools were closed because of a scarlet fever epidemic, and the teachers met day after day during this period and worked as faithfully as if they were teaching school. The whole task was a cooperative one. I asked the high school principal to appoint committees from his faculty to revise and in some instances to formulate for the first time the high-school course of study. I appointed an elementary supervisor, two or three principals, and two or three strong teachers and charged them with the re-

sponsibility of revising the elementary course of study. These committees in both high-school and elementary schools appointed subcommittees for different subjects in different years until finally every teacher in the whole school system, two hundred in number, was at work upon the task of formulating and revising the course of study. As these committees completed their work they submitted it for review to the committee that had appointed them. With the two original committees appointed I went over the work of the whole course of study making such modifications as seemed desirable before recommending its adoption by the Board of Education. Acting upon my recommendation the Board was unanimous in adopting the course, without even attempting to make changes.

It should be stated of both the original committees and of my own contribution that in some instances their work and the work of mine caused slight modification only, in some phases of the work medium and even large modifications were made, and in many phases of it none was made. On the whole, I should say that the major portion of the work was done by the teachers, and that only medum modifications were made by the two original committees or by the superintendent."

An example of the appointment of committees for particular subjects without a coordinating and consulting agency in a general committee—their members appointed in part by teachers, and exercising large responsibility in the framing of the course of study—is furnished by three different cities of twenty-five thousand to one hundred thousand population in the Middle West.

In Topeka, Kansas, the teachers of each grade nominated three of their number as members of committees from that grade for each subject. These were appointed by the superintendent. The chairman of each subcommittee was a member of the general committee for that subject. The superintendent worked whenever there was need for this help, but his particular function was to help teachers "in getting outlook, point of view, and fundamental attack made." Lay-

men were called in to assist. The general committee revised the work of the subcommittees, and the superintendent edited all courses for printing. The superintendent was assisted by a general supply teacher serving in a supervisory capacity in keeping in touch with the work of the various committees and subcommittees. Practically all of the teachers served upon some committee.

The Kansas City, Kansas, plan differed from the Topeka plan in that the superintendent appointed the chairmen of the "general committees" for the various subjects and conferred upon them in turn the power to appoint one teacher from each grade to serve upon his "general committee" and also three subcommittee members from each grade upon nomination of its members upon the "general committee." The superintendent also divested himself of responsibility for the work of the various committees until after the reports of the subcommittees had been completed. These he revised and returned to the chairman of the general committee. The report of the general committee when completed was to be sent to the superintendent, together with its recommendations. Whether he expected to revise these reports is not stated (their work is not yet finished). Members of subcommittees were expected to consult freely with other teachers and avail themselves of their suggestions.

In East Waterloo, Iowa, we have an example of extreme decentralization. While the committees were appointed by the superintendent, each teacher previously expressed her choice as to the committee she perferred. Every teacher was upon some committee. No principal was assigned to any committee except in an advisory capacity. Committees were constituted for portions of subjects, as in arithmetic, Grades I to III. The details of working out the course were left almost entirely to the chairman of each committee. All teachers had an opportunity to participate in the revision, first in a general teachers' meeting to which each committee report was made, and later by actual trial in the classroom. The superintendent "may make a few final changes in the course when it comes to

its final form, but the whole course will be essentially a course of study by the teachers who are doing the work in the classrooms," and he has not actively participated with any of these committees in their work.

The above citations are taken from the report referred to above prepared by me with the assistance of my graduate students and soon to be issued as a bulletin by the National Education Association. This study shows also the extent to which committees are used in the preparation of courses of study. If these facts for the years 1917–1918 may be regarded as indicative of the number of teachers participating in other phases of administration as well, then only 19 per cent of the cities in the United States in the year 1918 had made such use of committees as to secure reasonably full and free participation of teachers in the shaping of policies closely connected with teaching, while in approximately 33 per cent of the cities small committees of teachers were appointed without any organized means of receiving help or suggestion from teachers generally. In about 2 per cent of these cities, committees composed of principals, consulted their teachers in varying degree.

Perhaps the most valuable contribution made by this study for our present purposes is the confirmation of the validity of the efficiency principles accepted as basal in this paper. In order to ascertain what superintendents thought of the value of teachers' cooperation in the making of courses of study, they were asked, "(1) What does your experience show was lost by having teachers upon these committees? (2) What was gained?" Sixty-eight per cent. of those that had used committees replied that nothing was lost, 17 per cent. said a little time, while 8 per cent. of the replies, which might be interpreted as negative, indicated clearly that the superintendent had not done his part in the cooperative procedure. This practical unanimity that nothing was lost when coupled with the fact that practically all specified several important benefits for the course of study, the teachers and the superintendent, places beyond a doubt the confirmation of the validity of the principle of cooperation.

Evaluating the best plans described above for the participation of teachers in the management of schools in the light of the principles of management set forth, we conclude that the plan adopted in Topeka, Kansas, is the best because it provides not only for the free and full participation of practically all teachers in a representative way but also for the participation of the superintendent and his associates. Plans followed in East Waterloo, Kansas City, and Decatur seem to be faulty in the second respect although it is quite possible that the teachers share more generally in the Decatur and East Waterloo plans than in the Topeka plan. To me it seems very important not only that we have cooperation but that this cooperation embrace not one class alone but all classes and that the experiences and knowledge of each should have weight in the determination of the final results in the proportion to which their worth entitles them. If a superintendent participates only in the revision after the work is done instead of guiding while it is in process, the teachers lose that interchange of knowledge and experience from him to them. This point of interchange from superiors to inferiors and from inferiors to superiors is essential to the best management.

Examples of the fourth form of teacher-participation in management of schools—teacher councils—have been relatively few in number almost up to the present time. A bulletin of the National Educational Association received just a few days ago says, however, that over one hundred have been formed within the past month in accordance with recommendation of the Commission on the Emergency in Education which will be referred to later. If this report be true, we are evidently in the very midst of a unique period in our educational history, and our present discussion is most timely.

Teacher Councils differ from the committee form of participation in the element of time—the one is temporary, expiring when its particular task is finished; the other is permanent and constitutes an agency through which any problem may be taken up at any time and continued as long as desired.

They also make it easier for questions to originate in the body of teachers. Teachers' Councils are all alike in that they provide for election of members by the teachers, from teacher clubs as in New York, Minneapolis and Los Angeles, or from grades as in New Britain, or from buildings as in Cleveland. In New Britain the supervisory officers were members ex officio. In Los Angeles the Superintendent appointed three additional members to those chosen by the teachers. They differ among themselves in many ways, the most important of which is the leadership. In some cases, as in Los Angeles, New Britain, Connecticut, and Chicago the superintendent is, or was, the controlling factor, while in New York the board of superintendents plays no part whatsoever in the council. In other cities the superintendent has no official relation, but is invited to attend the meetings of the council, or conferences are held with him by the council after conclusions are reached as in Minneapolis and Cleveland. In New York the conclusions of the council are reported direct to the Board of Education, but in most of the other cities to the Superintendent who gives them that weight in the formulation of his action and recommendation which he desires.

The National Educational Association Commission on the Emergency in Education expressed the opinion on September 13, 1919, that "this participation by teachers is indispensable to the best development of the public school. We believe that such participation should be the right and responsibility of every teacher. To this end we urge that boards of education by their rules recognize this right, and provide stated meetings at which teachers will be heard. In order to guarantee such participation, we urge state legislatures—the final authorities through whose action local boards of education exercise the control now vested in them—to enact laws providing that teachers may appear before boards of education, and providing that these boards will give them an opportunity to present their suggestions and proposals for improving the work of the schools."

This recommendation has already stimulated plans provid-

ing for teachers councils and other forms of teacher participation in control of schools.

The different topics which have been noted as considered by teachers' councils are grouped as follows:

1. Those directly connected with the teachers' special responsibility—the instruction of children (*a*) courses of study (*b*) selection of text books (*c*) discipline of pupils.

2. Those associated closely with instruction of pupils—home work.

3. Those not closely connected with instruction (*a*) organization of special classes and special kinds of schools, (*b*) instruction in domestic science for average classes (*c*) types of buildngs and equipments.

4. Those dealing with conditions of employment (*a*) salary schedule (*b*) rating (*c*) promotion (*d*) double sessions.

5. Purely Administrative problem—formulation of the budget.

It remains for us to evaluate the various forms of teacher councils in the light of the efficiency and social principles presented as fundamental. Those principles set up certain ends to be reached in administration. The differences in the personnel of teachers, principals, supervisors, superintendents, school boards and citizens of the various communities are variable factors that make necessary differences in plans to achieve these ends. The form of teacher participation, however is not so important as the spirit and the substance. In general those forms are best which favor the best realization of the right attitudes and the most fruitful contributions from teachers.

The best form of teachers' council is that which provides on the one hand for the full and free participation of the superintendent and supervisors with the teachers, and, on the other hand, for parallel discussions in group councils or groups of teachers represented by the members of the council. Cooperation of all cannot be secured in any other way. The experience of the New York council without the guidance and help of the administrative leaders of the system who refused

to inaugurate such a body, shows the great help a wise sympathetic leader could give and the great opportunity afforded him for spreading his views and arousing enthusiasm among the members of his corps. The desirability of extended discussion among all teachers of the problem before the council appeared in Minneapolis and also in Cleveland. Regarding the Council in Minneapolis Superintendent Spaulding says,[1] "The weakness of that council was that its members did not always keep sufficiently in touch with their constituency. That is why the criticism developed; the constituency, not having the same opportunity that the members of the council had to understand every problem that came up from every standpoint, could not appreciate the real situation and thought that the members of the council were doing nothing for them." We quote also what he says of the situation as it developed in Cleveland.[2] "The same criticism developed that had arisen in Minneapolis. Representatives did not keep in touch with their constituency. They realized this fact and at the end of the year tried to redeem the situation. Everything was going on so well that I think the tendency was to forget the people that they represented and, of course, the people that they represented were not so enlightened as they should have been, although a report by the secretary was sent out after every meeting. Something further than a report seems to be necessary, however."

Another necessary feature of the best form of a teachers' council is the recognition in its organization that the superintendent has placed upon him the responsibility of the formulation of the policies upon which the schools should operate and, after their approval by the board, the chief executive for carrying them out. The scientific study of management of all kinds of enterprises confirm beyond a doubt the wisdom of this policy. The leader is the most important factor. He occupies the same position as the brain in the human nervous system. There must be some one center to which

[1] The School Review, October, 1918, p. 569.

[2] The School Review, October, 1918, p. 570.

all knowledge comes and from which all action proceeds. It is best that this office be performed by one man and that he be an expert in management in the particular field involved. Should a teachers' council in any way tend to transfer the leadership to the Board of Education, as would seem to be the probable result of the operations of the plan proposed by the Committee of National Educational Association, it would be most unfortunate for the schools.

The members of the council should be chosen by the teachers, who have common problems, organized in groups, and who can get together easily for discussion. The relative proportion of representatives for each group in a general council presents many difficulties. Here is one of the great weaknesses of the plan. Much contention has arisen in this connection as in New York. Teachers object, and rightfully so, to teachers outside their group expressing conclusions on their own problems. One way to avoid such a situation would be to have a council for each group of teachers concerned with certain types of problems as in Boston, where there is a council for each of several departments in the high schools. If this plan were followed out consistently it can readily be seen that if each council is confined strictly to those teachers most immediately concerned, the number of councils with a particular problem or group of problems would become large and that a teacher might be eligible to several such councils. It is likely too, under such circumstances, that there would not be need for permanent councils in many cases. Under such a condition a better plan would probably be to have temporary committees chosen by the teachers as in Topeka, Kansas.

This brings us to the consideration of the relative advantages and disadvantages of teachers' councils and temporary committees as instruments for the most efficient management of schools when each exists in its best form. It is necessary to differentiate not only among the different sized cities but also among the types of problems that are to be solved. We do not have sufficient data scientifically collected and

analyzed to enable us to answer the questions satisfactorily; but such data as we have seem to indicate that neither of these plans will work so well in a large as in a small city. The additional administrative and supervisory officers necessary to maintain cooperation and the free interchange of opinions and experiences among teachers are not provided for as cities increase in population. In the smaller cities it is believed that the temporary committee plan is better than the teachers' council, because of its greater adaptability. If, however, either in a large or small city the superintendent of schools is not favorably inclined to the cooperative efforts that come through the temporary committee and so does not maintain such committees in all subjects that are of interest to teachers and which are required for the best development of the schools, then it would seem that either a superintendent with the right view upon this question should be secured or teachers' councils instituted. Of these two alternatives I prefer the former. To my mind one of the most important points upon which the success of a superintendent should be judged by a school board is the extent to which he secures the cooperative participation of teachers in the determination of those policies of the school which most immediately concern their work.

It will be noticed that teachers' councils have for the most part been confined to the largest cities. It seems that because of insufficient supervisory force necessary to maintain relationships between the head of the school system and the teachers, superintendents have not fostered the close relationships between teachers that exist in the smaller systems. The teachers' council is a direct agency between those that are doing the real work of instruction and the superintendent who is held responsible by the Board of Education for the efficiency of the work of the school.

Upon problems connected with the course of study, textbooks, methods of teaching, etc., it would be possible as has been demonstrated in St. Louis, for temporary committees to render effective service in large cities. It is when super-

intendents desire a representative opinion from the teachers—one by which they will stand—as in Minneapolis and Cleveland, upon questions relating to conditions under which teachers work—such as salary, tenure, rating and promotion—that there seems to be the strongest reason for the existence of a body somewhat detached from the regular machinery such as is furnished by teachers' councils. I believe, however, that where the spirit of cooperation has been evolved in matters pertaining to instruction, teachers will give just as frank opinions and will work out with a strong loyalty, questions pertaining to their own welfare through temporary committees as they will through teachers' councils.

Summing up this topic, it may be said that frequent temporary committees are calculated to promote cooperation, good morale, and satisfactory working conditions among teachers in those cases in which the organization and personnel of the administrative forces of the school are adequate and competent but that when there is failure in these respects, the utilization of teachers' views of school situations and the preservation of the active and enthusiastic performance of their duties are so important as to warrant at times the creation of such a body as a teachers' council more or less apart from the regular school administration to represent their views to the superintendent or to the Board of Education. It would seem better, however, from the standpoint of the best management of the school to remove administrative officers not favorably inclined toward cooperative effort on the part of teachers and to increase the number of effective administrative supervisory officers favorably disposed to the spirit of cooperative endeavor to the point where the more satisfactory cooperation could be secured through frequent temporary committees.

A final section of this study still remains to be presented. Thus far we have judged conditions of teachers and teachers' councils from the standpoint of their worth in promoting efficient schools. We now have to consider what organization is best adapted to secure for teachers the realization of those

ends which a democracy requires of all its social groups, namely, the fullest and freest contact among its own members and the most effective contacts with other social groups. As has been indicated above, it is clear that where the interests of the teachers as a group do not receive full consideration they should receive from a superintendent, from a Board of Education, or from the citizens, the interests of democracy demand that an organization be formed through which they will reach a common mind and by means of which they can sustain a common interest. Furthermore, obligations rest upon teachers as well as upon other social groups to forward the interests of that phase of civilization which is specially in their care. The larger the number of teachers that participate in this effort and the more thoughtful consideration they give to it and the more constantly they keep their cause before the people the better it will be for our democracy. It is also true that the larger the number of social groups that they can ally with their cause, provided their aims are worthy, the better it will be for our democratic society.

Through what organizations of teachers can these social ends best be met. With unsympathetic Boards of Education which are more interested in keeping down taxes than in rendering service a teachers' council represents the best form of internal administration. It will give on the one hand, a solidarity to the teaching corps and on the other hand the strongest reason for the recognition of their recommendations. Such a body formally constituted by the Board of Education would likewise have greater weight with an unsympathetic people than a temporary committee would have.

Thus far, I have had in mind conditions of employment. As regards organizations among teachers to improve the profession of teaching and to promote the interest of education in society, organizations formed entirely without the school are probably better adapted to the purpose.

Should organizations composed of portions of teachers be formed for the advancement of conditions under which teachers work? I am inclined to believe that when the admin-

istrative channels already constituted do not secure for teachers reasonably satisfactory conditions under which they must work, then they are warranted, according to the social principles set forth above, in organizing themselves in order to study the situation presented and state their case in an effective manner, either to the Board of Education or to the people. I believe also that they are warranted in attacking any wrong social condition which works injustice to them and to society as a whole. It would seem, too, that if their cause is just they should welcome the assistance of any other social group that would help them in attaining their ends, provided they can still maintain freedom of action in the future to do what in their judgment is best for their own and the nation's welfare. On the other hand, it is just as clear that such an organization should not limit its membership to only one class of teachers but should be open to all—superintendents, principals, and supervisors. In drawing such a line between members of the teaching profession, the entire social group is weakened. Any exclusion of those skilled in performing administrative functions would make the efforts of such an organization to introduce reforms in administration unintelligent and biased, and would therefore, be contrary to the best interests of society.

Speaking specifically, it seems to me that the organization of units of the American Federation of Teachers would be warranted in those cities where the school board or people do not make adequate provision for teaching and other school expenses, or give them proper opportunity for initiative and freedom in their work provided membership in such an organization were open to principals, superintendents, and no distinction were made between workers and managers. But because of the fact that the American Federation of Teachers excludes superintendents and principals, I am of the opinion that in such cities individual organizations not affiliated with the American Federation of Teachers should be formed and the closest possible alliances made with other worthy social organizations interested in schools no matter

of whom the membership may consist. The American Federation of Teachers furnishes an example of an organization composed of teachers striving for biased and impractical administrative objects. "It demands first of all permanency of tenure based on service and not open to the whim of a school board. It demands further that teachers be granted a direct share in the management of the school, in the formation of courses of study, in the selection of principals, in the determining of school policies. It demands representation for teachers on the Board of Education and teachers' trial courts."[1]

Certain other extremists have advocated the selection of superintendents as well as principals by teachers on the ground that this is necessary to insure cooperation. This assumes that teachers are to have permanent tenure, or practically such, and that they are to determine policies of the schools. This is contrary to the principles of good management. While all may have a place in the development of school policies, it is those who are most expert, by reason of knowledge, training and experience, that should be placed in positions of leadership and their opinions should have the greatest weight in shaping the enterprise. It may be that sometime in the future, all public school teachers may be on an equal plane and that then they may select one of their own equals to attend to their administrative affairs, but such a plan, if adopted now, would wreck the public school system composed as it now is, of so many inexperienced teachers of relatively little school training, and of many others who do not have a professional attitude toward their work. The proposition of having teachers as members on the Board of Education is more absurd, if that be possible. Good management requires separation of authority among different organs of administration and non-duplication of persons in the filling of the positions which represent these organs. To place a teacher upon the Board would virtually make him superior to the superintendent. Experience has shown the un-wisdom of placing even former teachers upon the

[1] Glassberg, B. Organization of Teachers in the U. S. Dial, 67 : 243 S. 20,1919.

board of education. Upon this question there is no room for debate. The desires which prompt these propositions are laudable in that it is important that the teacher's point of view be fairly represented to the Board of Education and the people, but the manner proposed for securing this need would cripple the efficiency of the schools, and so cannot be accepted.

The unity of the social group of teachers including superintendents, supervisors and principals must be maintained, not only for the sake of its own immediate interest, but also in order that it may have the greatest effectiveness in its contact with other social groups. The lesion that has come through the failure of superintendents in the past to recognize the importance of frequent contacts of officers and teachers characterized by full and free expression in a frank, impersonal manner and of making it their primary object to serve and assist teachers rather than to control and direct them bids fair to be healed in most places, as is shown by the recent rapid increase in such efforts. Teachers should wait, superintendents should hasten still further their steps in this direction of cooperation and service. In case this way is difficult by reason of a small administrative and supervisory staff, the need for cooperative effort furnishes a strong argument for the strengthening of one of the weakest places in city school organization today. Every city needs a permanent staff, not to teach but to study intensively and intimately the teaching situations as faced by individual teachers, to bring together the results through cooperative study, and to recommend to the administrative officers what should be done to remedy deficiencies. Many of them can best be removed through cooperative effort by the line and staff officers working with teachers. A large organization of such a staff is badly needed in all cities. Administrative officers and principals with large buildings cannot do more than touch the surface. It is not to be wondered at that teachers, compelled to carry out orders which they know are not right and with little opportunity to satisfy the creative impulse, first become discouraged, then either pliant or rebel-

lious. The superintendent and principals in a small city can avoid this to a large extent because the number of teachers and pupils is relatively small. It certainly is an anomalous situation that as cities grow larger and as the number of teachers and pupils increase and as the difficulty of teaching situations increase in still greater proportion, the number of officers who can study the problems is decreased relatively rather than increased. This action betrays an absolute lack of insight into teaching which should be immediately corrected.

Without such a staff to assist the administrative line officers, superintendents should try to utilize principals and teachers to perform such functions. Doubtless many plans might and will be evolved. That recently adopted in the city of Portland, Oregon, provides for groups of three teachers from each school of nine or more teachers who will act as assistants to the principal, one representative from the primary grades, one from the intermediate and one from the advanced grades of each school. In the high school there is a similar committee of three, one from the teachers of the first and sceond year classes respectively, and one from the third and fourth year classes combined. The committees will hold regular conferences with the principals upon all matters affecting the schools including the merits of textbooks, courses of study, and general organization and management. It is intended that full opportunity be given to the development of initiative and courage in the teaching corps, it being specially provided that no individual or group of individuals shall be prevented or discouraged from the taking up of matters on their own account.[1]

Briefly, the conclusions reached in this paper are as follows: Both on the grounds of efficient management of schools and of the interests of democracy, participation of teachers in the management of schools is much to be desired. This participation must, however, be in close cooperation with principals, supervisors and superintendent. When these officers are efficient and are truly cooperative in spirit and in act, the temporary committee is the best form. When these two conditions

[1] School Board Journal, p. 66, November, 1919.

do not obtain, teachers' councils composed of teachers alone or teachers and principals should be formed and they should have the right to present their conclusions direct to school boards. In case both the of committees and of councils, teachers should virtually control the selection of members. A too small administrative and supervisory staff is the root of many of the difficulties that now prevent cooperation between superintendents and teachers. School boards, superintendents, and teachers should try to develop unity of effort. The aims of the American Federation of Teachers operate against this desirable end. It can be brought about provided people and school boards drop the shibboleth of low taxes and adopt service as their watchword. The welfare of our democracy demands that this be done and that it be done without delay. Finally, while these conclusions have utilized facts and principles deduced therefrom to the greatest possible degree, they must be accepted as tentative until the inferences drawn from them are examined in the light of additional facts gathered and analyzed with scientific method. The writer with the assistance of a number of his graduate students has entered upon such a quest and they hope at some future time to make contributions that will aid materially in the solution of the problems involved in the participation of teachers in the management of schools.

THE NATURAL HISTORY OF DRAGONS

By Clarence G. Child

Professor of the English Language

Somewhere about the house where there are books and children will be found the fairy tales of Jacob and Wilhelm Grimm. The book is the imperishable monument of two brothers, great scholars, knit together by the closest love and sympathy, who shared together in youth one bed, one work-table, a common stock of books, and found as men a common joy in scholarly research, in sunshine, flowers, poetry—so closely bound together that in that moving discourse which Jacob Grimm delivered in 1860, six months after his brother's death, three years before his own, he said, "I shall speak here of my brother, whom for a half-year my eyes have not seen, who yet still by night is ever with me." Great as their fame in other ways, it seems peculiarly fitting that they should find a common memorial of their close love and comradeship from youth in this book that children love.

One is certain to know the *Household Tales*. Chance alone may lead one to another work, as fascinating, by the greater of the two brothers, as chance led me long ago. I saw the name Grimm on a library-shelf, and eagerly took down volume after volume. All were in an uncouth tongue I could not read, and in that Gothic letter from which Henry VIII, of blessed memory, by accident delivered us. Then I lit upon one in English, the *Teutonic Mythology*, whose translator bore the curious and intriguing name of Stallybrass. The volume I opened had page-headings: horse, ox, bear, wolf, cuckoo, snake, dragon, beetle—a strange menagerie. The word *Dragon* caught me. What matter if I had to brave innumerable unknown words, meaningless references, dryest of pemmican for the suckling. The great scholar and humanist

could not fail his reader. There was plenty worth the finding. I read of the dragon, the "watchful one," lying on guard upon his gold, gold hence called the "dragon-bed," issuing forth by night from his hole in the hill, scather of the air, scattering fire and poison. Close followed the tale of the beautiful Thora, to whom was given a young dragon. She placed him in a casket with such gold as she had. As he grew, grew also the gold. The chest became too small, and he lay encircling it. Soon he filled her chamber. He lay about the wall with his tail in his mouth, and let no one come near him save to feed him his daily meal of an ox, till Ragnar Lodbrock slew him and won the gold and Thora as his bride. Not alone of dragons, but snakes, I read—snakes and dragons are one—winged snakes with diamond eyes, snakes with golden crowns that visit children and sup their milk, snake-maidens diademed with pale strange beauty, snakes that guard treasure-caves and arch themselves into a bridge across the raging torrent for anyone truly brave, who, if undaunted, may pass and take what gold he will. And I read of dragon-money left lying for a trap on the ground—a penny perhaps, and you pick it up and there is a silver piece next day, and so on. But when it becomes a thaler, leave it or you are under a curse. You cannot get rid of it. Spend it, give it away, throw it away, it comes back to you. One thing only you can do, and that is to sell it for less than its value, and then the curse goes with it. This is the theme, surely, far back, of Stevenson's *Bottle Imp*. Where, one wonders, did his story come from, before it passed into the old play in which he found it.

These half-dozen pages in Grimm placed me in the dragon's power forever. It was Jacob Grimm, and in great part through these two books, who, before all others, gave inspiration and method to the modern science of folk-lore and the modern scientific study of myth. It is a pity that Grimm could not have foreseen the story of the dragon in full as traced in the picturesque theories of modern students. What a part, indeed, has the dragon played in the slow-woven web of tradition that has broadened out under the ceaseless shuttle

of time from myths immemorially old down to modern literature. To be sure he is at present relatively scarce, even in fairy-tale collections based on folk-tradition. Run over your memories of Grimson, Andersen, Perrault, the polychromatic volumes of Andrew Lang—how many dragons can you remember? This is at first sight curious, for once he was everywhere in folk-tale, saga, myth—as one commentator on *Beowulf* said, he seems to have multiplied like jack-rabbits, and another avers that there is nothing more "commonplace" than dragons. He has, in fact, nearly become extinct, or persists only in changed forms as far from like his true self as the club-moss and bulrush are unlike their relatives, the pine and the spruce. The reason is simple. Fabulous monsters, like real, must be fitted to survive—the hippogriff, for example, is as extinct as the dodo. In a story, an action, the giant who was not only terrific in combat, but also human, and as such played a part engagingly clumsy and stupid, was far better fitted to survive. The single virtue of the dragon was to stand on guard over his treasure and put up a fine fight against the hero; the rest of his appeal lay in the fantastic terrors of his appearance. In the folk-tale and later romance, he did become a mechanical property, even a commonplace. But, fortunately, his single virtue gave him some great appearances in saga, made true epic stuff of him, gave perpetuity to his tradition. He became, indeed, a sort of symbol and trophy of heroic prowess. Whether or no, after Uther Pendragon saw the two dragons fighting in the sky, it was Uther and Arthur who were the first to shape banners dragon-wise, certain it is the long dragon-standards swung from the planted poles by the pavilions in the field to Froissart's time or later—and very properly, by that same token, the dragon a few years ago was added as a badge to the achievements of the Prince of Wales.[1] Gunpowder blew chivalry from the battle field, but a living tradition in the 17th century gave his name to the dragons, whose muskets belched fire fearfully like him.

To search out the dragon in his true greatness is to learn

[1] Encyclopædia Britannica, o. v. dragon.

strange things. For that search your best way lies through the corridors and galleries of remembrance where hang the panoplies of great knights and paladins and heroes of the far North and of the Midland Sea, with their famous swords along sheathed, Durendal, Joyeuse, Excalibur, Nægling, Harpe, and the rest, out into the lands of epic story. But choose your path rightly. Do not go that way—that will take you where Ogier smites in the teeth the craven who gives back from the foe with the Emperor's oriflamme, where Roland sounds his horn, and where the youth Vivian, dying upon the bloody field of Aliscans is houseled by his uncle William. There are no dragons there. Your direct way will lie rather by lands of later romance and Northern story, Britain, Ireland, Iceland, the deep-cleft coasts of Scandinavia, over bare moorlands, by old barrows on wave-swept cliffs, through the deep forests and mountain gorges of central Europe, on to Thessaly, land of enchantment, meeting-place of classic and Gothic tradition, where Faust met Helen, and so to Greece, Persia, India, and beyond. With what stores for curious inquiry and reflection shall you win home. Consider this list of the gods and heroes and saints who in some sort have fought and slain the dragon: Indra, Trita, Susanowo, Chorio, Faridun, Rustum, Zeus, Phoebus, Apollo, Hermes, Dionysos, Hercules, Cadmus, Jason, Perseus, Theseus, Bellerophon, Thor, Wada, Siegemund, Siegfried, Beowulf, Frotho, Ragnar, Roland, Lancelot, Tristram, Bevis, Guy, Dietwar, St. George, St. Margaret, St. Germain, St. Marthe, St. Marcel—one might add a score or two more and not be at end. The list, I trust, is long enough to be edifying. It is selective and eclectic—for one must have an eye to the humanities and common sense as well as to purely scientific considerations. The modern scientific mythologist would sneer at some of these worthies as being late and degenerate—mere triflers and copy-cats. But he, for his part, goes to wild extremes. The Indo-Germanic field, for a time contents him and he manages to get in pretty nearly the whole classic Pantheon—and then he itches to run outside after strange gods like Osiris and the

Babylonian Marduk. One wonders why he has not found a place for the great serpent god of the Aztecs. Huitzilopochtli, or better still Quetzalcoatl, "feathered serpent," with his fascinating tufts of blue humming-bird feathers, who, it is said the early Spanish missionaries in Mexico told their flocks had really been St. Thomas come over to convert them from his apostolic diocese in farther India—a notion which links up picturesquely with modern theories of traces of Asiatic art along the western shores of the New World, and an Egyptian cult of a serpent goddess brought to our shores by adventurous voyagers from Asia trading across the Pacific islands for shell.[1]

Curious enough are some of the candidates for dragon-fights whom the mythologist admits. Cain one is tempted to black-ball at once. The prophet Daniel must freely be admitted; he disposed of his dragon by entangling his teeth with a ball of pitch, as Theseus did the Minotaur, just before he was thrown in the lions' den. Jonah, one feels some hesitation about—there was very little fight in Jonah, but it is quaint to put him alongside Hercules, who jumped into the sea-monster's mouth in saving Hesione and emerged with all his hair burned off by the beast's fiery entrails. One thinks it absurd, at first, to find the mythologist admitting all kinds of sea-monsters—everything seems to be a dragon that comes into his net—but in this he is unquestionably right. The dragon was originally an anomalous serpentine creature, and these monsters characteristically are serpentine, even though often later given fish-names or attributes. Moreover, except in later developments in Europe and elsewhere, there is abundant evidence of the close connection of the dragon with water—the sea, lakes, pools, and rivers. Consider the references in Scripture, especially those to Leviathan, and

[1] As a matter of fact, Maza and Aztec divinities have been brought into connection with the dragon-cult by G. Elliot Smith, whose book, *The Evolution of the Dragon*, though ordered some months before, was received a week after this lecture was given. A summary of it is given below. The connection of the "Great Mother" with the dragon, and transference of the cult to America was the subject of a correspondence in *Science* some years ago; it is treated at length in this volume.

the folk-lore of Asiatic countries, to be touched upon later. To this brood of sea-dragons, belongs the Midgard snake that encircles the earth, the Kraken, and the Great Sea-Serpent, in whose existence even now some persons believe.

In this array of old stories, shifting into countless forms with the changing beliefs of men, ever anew, simplified, expanded, intensified, motivated, by the kindling fancy of the poet, yet preserving a fundamental unity of theme despite superficial diversity, the modern mythologist seeks to find a far-off common origin, a hidden but discoverable common meaning. Attempts to explain localized versions of the story, of which there are a plenty, will not do; the theme of the dragon-fight, so widely distributed, must go back to a parent source, and that must be found, without invoking fanciful allegory, in a myth that fits some fact of nature. Accordingly the mythologist probes, analyzes, finds his clues in this and that detail, searches out the primitive belief that lies behind. From the grey dawn of the world, man has fashioned myths to read the riddle of the sun and moon, the stars in their courses, the changing seasons, the tides, the lightning and the thunder, the burning mountain and burning spring, the quick poison of the serpent, the power of plants to harm or heal, the fire in the heart of jewels, the color and temper of metals. Meanings must be found and these meanings, told and accepted, shift, change, run along the earth, quicken upon the wind, take to themselves new shapes of beauty and terror. Here in the dragon story, once often regarded as a solar myth, one recent theory[1] finds a reading of the mystery of the moon. Tonight the moon hangs full-orbed—within a day or two darkness creeps across its disk till it shrinks to a thin rind of silver, and blackness shrouds it. It is dead but shall live again. Again appears the thin crescent, broadens, till the

[1] Ernst Siecke, Drachenkampfe. Untersuchungen zur indogermanischen Sagen-Kunde., Mythologische Bibliothek, herausgegeben von der Gesellschaft für vergleichende Mythenforschung, vol. I, Heft 1. Also Ernst Böklen, Adam and Qain im Lichte der vergleichden Mythenforschung, ib., Heft 2, 3.

clear splendor shines full and round once more. This is not the sun's doing, for both the sun and moon may be seen at once in the sky. It is an endless strife between the hero of light and the dragon of darkness. For a time the dragon is victorious and the moon's splendor is engorged, but at length the hero's strength is renewed, he reappears and overmatches his adversary. Thus in India, apart from, or earlier than, his typifying divine might and his office as overcoming drought and consequent famine, Indra, in his shining apparel, is the moon hero. He is overpowered by the demon-dragon, Vrita, but again slowly waxes victorious, and drinks the mystic Soma—so, when you see the moon hang full-orbed and golden, you shall know Indra has drunk his draught of golden honey-mead. Then, as time goes on, the myth shifts into countless forms. It is attracted to sun-gods, like Phoebus, or the hero becomes a detached figure, the moon, no longer the hero himself, becoming (because of or accompanied by a change in gender of the word for moon) a maiden in distress, prototype of countless hapless ladies saved by the hero's prowess. Or the dragon changes to human shape, with snake forms attached, as in the case of Zahak or Medusa. But through all the versions in their shifts and changes, the mythologist believes he can trace the moon-myth—in the persistence of such details as the shield, the crescent horns, the double axe, the curved sword like that which Perseus used, the swallowing of the hero, the period of time during which his strength is eclipsed, and the like.

This is a pretty theory—not so far-fetched, possibly, as it sounds or as its adherents in their zeal make it appear—but one confesses oneself attracted by its picturesqueness, rather than by a clearly demonstrable soundness. One is tempted to ask, if a dragon swallowed the moon, where in the first place did the dragon come from? And far and wide, wherever you find him the dragon is connected with the sea, and he spits fire and venom, and he hoards treasure, the Golden Fleece of Jason, the golden apples of the Hesperides, the Niebelungen gold: how do these come in? Whence came he?

Is he, as Charles Kingsley and many another, aforetime and today, have surmised, an ancestral memory of the great geologic monsters which, it has been urged, must have blasted living things yards around with their fetid breath? Is he an enlargement of the flying lizards of Asia, whose spread membranes simulate wings? Is he an elaboration of the crocodile, and has he wandered out of Egypt into all lands as the cat did? All these suggestions have been made.

One favorite explanation is that the dragon, as so many of our myths undoubtedly did, found his way from India. One knows in a vague way of Indian dragons, but to me at least they came much closer a year ago when Dr. Burlingame of Yale brought in his Buddhist tales[1] to show me—absorbing tales that made me forget the chill winter's day in the blaze of Indian suns and the mystic sayings of Budda. As I read one and another I asked, "Are there dragons in these tales?" "Yes." "Do they spit fire?" "Surely," he answered, "read this," and I read how a certain monastery agreed that each monk who thought a sinful thought should fetch a jar of sand from the river and pour it in a certain place. In time a great heap was formed, and a dragon-king came and sat down upon it. Now the future Buddha sent one of his elders to test the monks. They refused him shelter. "Give me that mound of sand," said the Elder. "No, it is the dragon king's." None the less, the Elder went to the heap, and the dragon thought, "I will puff smoke at him and kill him." But the Elder saw into the dragon's mind and said, "I will puff smoke also." So they puffed, and they puffed, and the dragon fled. And the Elder made his whole body burst into flame, so the monks thought him burned to a crisp. But he sat at ease on the mound, and the humbled Dragon-king surrounded it with choicest food, and created a hood as large as a pent house to cover his head. So were the monks brought to seek shelter from suffering not in a forest, a wood, a tree, but in the Law and the Order of Buddha.

[1] E. W. Burlingame, *Buddist Legends from the Dhammapada Commentary*, Harvard Oriental Series, Vol. 30 (in press).

Note in this story a significant feature—the Dragon-king shields the Elder's head with his hood, just as the Buddha himself was once shielded by the coils and hoods of the Dragon-king Mucilinda. There is no mistaking his genus—he is the cobra, feared and reverenced, with his huge strength, his lightning swiftness, his deadly poison, his puffed-out hood. Fear of the cobra is deep engraved in the Indian heart, and that of the Anglo-Indian also—you remember the story told of Kipling, how in London, slipping his foot into his shoe while absorbed in writing, felt the tongue, and, with the old instinctive terror, kicked the shoe the length of the room and smashed a mirror: which may remind us, incidentally, that Rikkitikki-tavi ought certainly to be added to the list of dragon-heroes. Where else than in India, with this constant menace close at hand, could the snake be more readily converted into a supernatural form? If you fear the gods, speak them fair. At all events, it is fact that, in serpent worship of a dateless antiquity, the cobra became a demonic being, the Naga—the cobra's scientific name, by the way, is *Coluber Naga*. These serpent-kings or Nagas were fabled to dwell in countless numbers in seas and rivers and lakes, in marvellous palaces filled with treasure. They hoard gold, and precious gems of wondrous powers, the "jewel of the tides," the "pearl that grants all desires." They may change into human form—similar interchange is found in the European dragon—and their women, when in human shape, are of supernatural beauty. But all are quick of temper, deadly with their poison. Yet they sometimes entertain mortals in their marvellous underworld palaces, as knights are entertained in the fairy realm of Celtic legend. One of their legends is, or was, used in the ceremony women hold in honor of Manasa, the queen mother of the snake-princess, at the time when the long rains begin and the floods drive the cobras into villages and compounds—a long and charming story how the orphaned girl Lahana was twice taken down through a lake by two snake-princes to their queen-mother, Manasa, and sent back with first one half, then the other half of her body covered with jewels, till, her kindness

and goodness fully attested, they won for her the paternal favor of the Emperor.[1]

As regards India being the source of the dragon, one difficulty is the form of the Nagas, who are depicted either simply as snakes, or as human beings with snakes on their necks, or, in dragon shape with a horned head, human body and coiling tail. But the latter form, according to experts, is late and attributable to Greek influence. If this is true, it is curious, for the Chinese dragons on the one side and the Semitic and European on the other have legs, and it is not assumed that the Chinese dragons derive from this later tradition. It is to be remembered, of course, that separate centres are likely to have their own individually generated monster forms, and that in the transmission of foreign myths, the foreign myths are likely to fuse with the native, rendering the problem of origin very difficult and uncertain. Yet some connection must be, because of common elements persisting over the entire field—in this case, the snake form, connection with water, love of treasure, poison, and, almost everywhere, the breathing of fire and potency for evil—and the problem continues to be as fascinating as it is baffling.[2]

[1] In D. N. Neogi's Tales, *Sacred and Secular*, Calcutta, 1912, "The Divine-Human Relationship." In the same volume is told the story of "Thebaw's Queen" referred to in Kipling's *On the Road to Mandalay*.

[2] A note may be inserted here summarizing the hypothesis offered by G. Elliot Smith in his recent book *The Evolution of the Dragon*, University of Manchester Press, Longmans, Green & Company, 1919, received after this lecture was written. The author places the origin of the myth in Egypt and Babylonia. The King's beneficence in initiating irrigation works led to his becoming the personification of, and the person able to bestow, the vital powers of water. "Hence it was not illogical to kill him when his virility showed signs of failing and so imperilled the country's prosperity. But when the view developed that the dead king acquired a new grant of vitality in the other world he became the god Osiris who was able to confer even greater boons of life-giving to the land than was the case before. He was the Nile, and he fertilized the land. The original dragon was a beneficent creature, the personification of water, and was identified with kings and gods. But the enemy of Osiris became an evil dragon and was identified with Set." In conjunction with the cult of the Great Mother, and human sacrifices to rejuvenate an

As India, so China, Korea, Japan, have their dragons.[1]

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aging king, the goddess becomes identified with a man-slaying lioness or a cobra. The myth of the Great Mother and of Horus and Set became blended, and an evil dragon emerged, a composite of the animals with which their various deities were identified. Astronomical versions of the story arise from her identification with the moon, and Horus, became her son, with the Sun. "The identification of the destroying-goddess with the moon, the eye of the Sun-god, prepared the way for the rationalization of her character as a uratus-serpent spitting venom and the sun's Eye spitting fire at the Sun-god's enemies." It is not possible to summarize here the multitude of details and range of special cults and rites brought into connection with the discussion. The explanation of the association of the dragon with treasure starts with the connection of the shell-amulet (the cowry and its surrogates) with the cult of the Great Mother (to us exemplified most familiarly in Aphrodite), the passing of this to the pearl-oyster, conch, and others and the consequent association of the pearl with the moon as drops of moon-dew fallen from the sky into the oyster. Pearls became an expression of the vital powers of the ocean, and "the same explanation was extended to include fishes and other denizens of the water, as manifestations of similar divine powers . . . When the value of the pearl as the giver of life impelled men to incur any risks to obtain so precious an amulet, the chief dangers that threatened pearl-fishers were due to sharks. They came to be regarded as demons guarding the treasure-houses at the bottom of the sea. Out of these crude materials the imaginations of the early pearl-fishers created the picture of wonderful submarine palaces of Naga kings in which vast wealth, not merely of pearls, but also of gold, precious stones, and beautiful maidens . . . were placed under the protection of shark-dragons." The discussion passes on to the octopus, swastika, Mother-pot (whence the Celtic cauldron of plenty, Holy Grail, and witches' cauldron), the Tyrian die, mandrake, ginseng, etc. The author believes that the myths, originating in Egypt, and the eastern borders of the Mediterranean found their way in an indefinite antiquity to India, to China, to Japan, and across the Pacific to this continent.

The effect of such books upon the layman is to leave him mentally gasping. It is not right, however, merely to enjoy such a book as a piece of picturesque fantasia or to dismiss it as based on unsupported assumptions or ingenious special pleading. It displays striking ingenuity and true constructive imagination, and the adventurer in so difficult a field should be credited with courage, and read with respect and sympathy.

[1] M. W. De Visser, *The Dragon in China and Japan*, Verhandelingen de Koninklyke Akademie van Wetenschappenrte Amsterdam, Afduling Letterkunde, Nieuwke Reeks, Deel XIII, $2, Amsterdam, 1913.

One has seen them pictured, embroidered, carved, cast in bronze, as in the wonderful collections of the Boston Museum of Fine Arts (where do not miss the lion-dragons of Korea), but that tells little of their marvels. The fabulous lore about them is inexhaustible. In China, the dragon, phoenix, unicorn and tortoise are the four spiritual beings, that give omens. The dragon was embroidered on the Emperor's dress—the emperors were called dragons or fabled to be dragons' children There are scaly dragons, winged dragons, horned dragons—and curious half-breeds for the dragon mates promiscuously with other animals. Yellow dragons are born from yellow gold a thousand years old, blue dragons from blue gold. They live like the Indian Nagas in seas and lakes, or in holes in the hills—many hills and mountains in China and Japan bear dragon names. They are afraid of iron, centipedes, five-colored silk thread. They love and hoard treasure, and eagerly devour swallow's flesh. Their blood in the earth becomes amber, their spittle hardened in the sea the most precious of perfumes. They remain in the egg three thousand years. The eggs are like beautiful stones. Guard against keeping a dragon's egg, it may split asunder with thunder rain, and darkness as the young dragon rises to the sky. Like the Nagas in Northern India, they are bringers of rain, but in a fashion of their own. Storms come from dragons that rise from the sea or lakes and in the sky—in China iron or filth was thrown in their pools to anger them and make them rise, whereas in India, the Nagas were entreated with prayer and offerings to bestow the gift of rain.

To the inexpert observer, the Chinese dragons seem more gorgeous, fantastic, decorative; the Japanese more conventionally artistic and poetic, and at the same time more tame. But the Japanese legends are entrancing. I was told the other day by a Japanese the great epic story of the Kusanage sword found in the tail of the eight headed dragon of the river Hi, and how the Prince who possessed it, warring against the barbarian Ainu, waved it, and the onrushing fire in the grass and brake they had lighted before a fierce wind to destroy him,

stopped, turned, and destroyed the barbarians instead; and how the sword was at length returned to the dragon king in his palace under seas by his son, who had caused himself to be born emperor to regain it. Strangely beautiful too are the stories of the dragons lights that drift down at night from the dragons of the mountain or up from the dragons of the sea and hang suspended in the old pine-trees before temples in honor of the shrine within.

Compared with the exotic traits of these denizens of the far East, the European variety is a simple creature, though he can be amazing enough. In his tractate on Natural History in 1774, Goldsmith wrote, "The Dragon is a most terrible animal, but most probably not of Nature's formation." Nature is not so free in her fashioning as man. Vasari tells of Leonardo that as a boy he made a careful study of reptiles and insects before he drew a dragon on his wooden shield. The method was in a sound tradition except for his Ruskin-like care as to details. The Classical recipe, like the Chinese, seems to have been to hitch together parts of any animals that might produce gratifying results; one standard concoction was bull, goat, snake as in the famous line in Lucretius. Possibly the modern biologist might reproduce for us some of these classic exemplars; he already grafts eggs of different insects together and hatches monsters. With such a complex to begin with, you may diversify it by multiplying its heads to three, five, seven, eight, fifty, a hundred, a thousand—the number does not seem controlled by any mathematical formula or the Mendelian law. A certain famous European folk-tale of the seven-headed dragon has, so Dr. Speck tells me, become widely naturalized among our American Indians.[1] Let us trust he may not prove an undesirable alien.

Much better than these abnormal variants (I admit prejudice) is the Gothic simplicity of our Northern dragon. He is distinctly ophidian, with a crocodile head, stout body, legs two or four, a long tail. He flies, but we cannot be sure of

[1] Stith Thompson, *European Tales Among the North American Indians*, Colorado College Publication, Language Series, Vol. II, p. 323.

wings in all cases, for Beowulf's dragon, as one commentator, Lawrence, notes, was apparently driven along by his own fires —*fyre gefysed*—proceeded under his own steam, as it were. He gathers gold, or searches it out when buried in barrows or grave-mounds. "The place of the dragon" says the Old English *Gnomic Verses*, "is on the grave-mound, exulting in treasure." If you would know how his head looked, examine the replica of King Aelfred's Jewel, presented to our Library by Dr. Penniman. The jewel was found near Athelney, perhaps dropped there by Aelfred when he was harboring from the Danes. A beast's head forms its terminal part. Some have called it a boar. That is nonsense—pigs do not have large and regular scales. Beneath the throat of the long reptilian head one can see them plainly—the scales beneath the throat, by the way, in Japanese legend might not be touched, however friendly the dragon.

Our Northern dragon is a reasonable beast reasonably shaped, and can hold his own, be impressive, in serious literature. Apart from Greco-Latin myth, the two most notable appearances of the dragon as a leading character are Northern. One can number only two serious rivals in other literatures. One is in the classic drama of Japan[1]—those strangely beautiful plays that blend dialogue, choric chant, and statuesque dana in a single artistic perfection. Chorio, the hero, comes, warned by a dream. He stands by a raging torrent.

> The morning moonlight lies over the world
> And flows through the gap of the mountains.
> White frost is on the bridge, the crisp water wrinkles beneath it.
> There is no foot-print in the frost on the bridge,
> No one has been by this morning.

An old man appears and to test his courage drops his shoe in the torrent. Chorio leaps in—the waves draw back—a thick mist covers the place—a dragon ramps among the whirlpools, lolling out its fiery tongue. Chorio strikes with his sword—there is a terrible light upon it. He regains the shoe and

[1] Ernest Fenollosa and Ezra Pound, "*Noh*" *or Accomplishment, A Study of the Classical Stage of Japan*, New York, 1917.

buckles it on the old man's foot. "That dragon was Kwannon. She came to test your courage. She must be your goddess hereafter" . . . Then the dragon went up to the clouds, and the old man drew back to the highest peak, and set his light in the sky."

The second is the story of Zahak, the serpent-faced, in that golden book, of the Persian poet, Firdausi, the Shanameh, Book of Kings. Zahak slew Djemschid, the good emperor, by sawing him in two lengthwise on a board. Iblis, fiend of evil, comes to him as cook, and serves him meat—none had eaten meat as yet. He fed the king on blood, on yolks of eggs, then partridges and silver pheasants in a golden dish, then lamb and fennel, then veal sauced with saffron, rosewater, musk and old wine. In ecstasy, the King offers him a boon. He chooses to kiss the King's shoulders—and at once two huge black snakes grow from the King's shoulders to torment him till death. They must be fed on human brains, and two youths daily must be sacrificed. The sons of a blacksmith are called for, a man of brawn and courage. He defies the Emperor in his audience chamber, and storming forth, takes his leather apron as a standard, the black dragon-king of the writhing serpents is slain, and the leather apron, covered with jewels, becomes the national standard of Persia.

There can be no doubt, however, that the two great Northern dragons are by far the most impressive. However cheapened by operatic presentation—opera dragons are too often Pantomime beasts—there is no gain saying the might and terror of Fafnir, ceaselessly watching the cursed gold on the desolate heath—"he stepped off the gold, blew poison, shook himself, and struck with head and tail"—and the part he plays in the great epic story is perfection. So, likewise, Beowulf's dragon in the old stone-walled barrow, on its high cliff, with the fiery reek of his breath pouring from its mouth, and the smoking ooze dripping through the gray stones from his litter-bed of cups and rings and plated gold. There is no "fairy-tale commonplace" about that picture, or the soul-stirring, the noble fight that follows.

No such distinction attaches to the dragons in later literature. They still possess romantic appeal, but they become too common. In the Alexander and down through the later romance and the degenerate tales of knightly adventure, they are a stock-feature. They are episodic and incidental, and both intrinsic importance and true epic inspiration was lacking to make them real and awe-inspiring. Thus the dragon Tristan slays in Ireland, thereby saving himself when betrayed by the splintered sword, is a merely subordinate though necessary element in the plot; any dangerous beast would have done as well. So, too, in Sir Eglamour or in Sir Torrent, the knight kills one, later two, and each time with a giant thrown in for good measure. When specially "featured," some are comical creatures. In that robustious and lively tale, the English *Sir Bevis*, two kings of Apulia and Calabria, we are told, fought so wickedly that they were turned to dragons vile, and a hermit's prayer sent one flying to St. Peter's bridge in Rome, where he lies in the Tiber, stirring every seven years and sending up a hideous stench, and the other to Cologne, where Bevis fought him. He had tusks seventeen inches round, a body twenty-five feet long, and sixteen feet of tail. With this tail he struck Bevis, and Bevis had died, had he not gone head-first into a holy well where a blessed virgin once bathed. There he lay at ease—for the dragon could not approach a holy well—drank a "gallon or more," and issued forth, cured of his ills. This time the dragon spewed on him a "gallon" of venom, so that "measles" sprang out all over him—and then twice more struck him with his tail, each time making a bull's eye for the well. In despair, for his enemy each time issues hale and sound, the unlucky beast starts to fly and Bevis catches him in the air with the death-stroke, as St. George did—the St. George legend, by the way, is thought to have borrowed from Sir Bevis. Or take the German *beau sabreur*, Dietwar, prince of Rome, suing for the hand of princess Minne. That very modern young lady, a true sportswoman, must first try him out in the hunt. She shows her own skill to admiration, till

a dragon appears, which he kills, but is horribly wounded. Then, like a heroine in a Mid-Victorian novel, she nurses him well again, and one of the dragon's tusks is the central ornament of the wedding-breakfast.

A chapter in this history, worthy of a book in itself, is the story of the dragon's appropriation by the Church. Many pagan beliefs the Church accepted, necessarily as a matter of compromise in the process of conversion, or voluntarily as profitable for Christian uses. The heathen sorceress, the witch, unhappily remained, not only because there was biblical warrant for her, but because she summarized accursed practices against which the Church waged war. Her terrible history runs down close to our own day—and at the same time she made for herself a creditable literary career by the romantic force of her personality. The dragon also was adopted by the Church on scriptural warrant. In the terrific visions of hell, having their remote source in Oriental tradition and their immediate exemplars in the reputed visits of St. Paul and St. Patrick to the underworld, which run throughout the Middle Ages getting worse and worse as they go, the huge mouth of the devil is sometimes pictured as yawning open dragonwise with souls by the thousand dropping into it like flies. In the Scandinavian hell, one may recall, is the fearful dragon Nithhoggr, who sucks the blood from corpses—derived and transmogrified from Christian myth, one suspects, like other elements of the later Northern cosmogony. Furthermore, among the hideous hell-beasts, dragons appear, and devils, greater and lesser, are fond of taking dragon shape in which to assail anchorites and martyrs. Innumerable are the doughty saints, many of them women, who, in the legends, fight and overcome actual dragons or devils in dragon shape—St. George, St. Germaine, St. Margaret, St. Marcel, St. Martha, and many more; the strife of the Archangel Michael and Lucifer came to be conceived of as a dragon battle. But St. George takes first place, of course. The dragon affair, so important popularly, is really a minor incident in his complete legend; it was the vogue of his legend as a Christian soldier

and martyr (the apochryphal account of his martyrdom is one of the most astonishing documents in all Christian hagiology) which during the third crusade led the English to adopt his name as a battle cry, as the French had that of St. Denis, and, as this received official sanction in 1222, he became in due course the national saint of England.[1] It would be ungallant not to mention one woman-saint at least. In the Middle English life of St. Marguerite, Margaret, who is singularly gifted in being able to deliver long and most admirably composed prayers under the most exigent circumstances, is actually swallowed by the monster—but the unspotted maid, undismayed, made the sign of the cross, whereupon the devil-dragon burst asunder, and she came forth unscathed. It may be added in this connection that, in the solution of that curious and difficult question where the medieval devil comes from, the suggestion has been made that his tail, that he whips round his neck from side to side so entrancingly as he advances upon his victim, was a heritage from the dragon—a considerable shrinkage to which only unscientific fancy can supply a parallel in the case of the human skeleton.

This brief outline will serve to show how romance and Christian legend run down side by side. Passing to the modern period, there is so far as I know, but one serious and great dragon-fight in modern literature, that in Spenser's *Faerie Queen*. In his fabulous world, so vividly realized pictorially, despite the insistent pressure of his involved allegory, the old romances he drew from and Christian symbolism alike would lead him to make use of the dragon. He has in fact made generous use of him and early in the poem. There are no less than three dragons in the first book. The first is the dragon of Error—hideous half-snake, half-woman, belching forth filth and stench and suckling her foul brood who at the light of truth creep into her mouth for shelter—a picture which, like Milton's Death has been a commonplace for critical discussion as to the proper bounds of poetic fitness, but which

[1] See the articles on St. George by John E. Matzke, Publications of the Modern Language Association, Vols. XVIII, XIX.

Burke neatly disposed of by the phrase, "nauseating, but sublime." The second is the eight-headed dragon of the Apocalypse on which that amazing sorceress Duessa so magnificently rides. The third is that tremendous beast whose three-days' fight fills the whole of the 11th canto. No proper appanage of a dragon fails him—vast body, brazen scales, "flaggy" wings, tail with double sting, and "three ranckes of yron teeth in which yett trickling blood, and gobbets raw of late devoured bodies, did appeare." Too long, too hard to follow is the fight—but one detail is unusual, that knight and horse are seized and carried through the air, till their weight forces him to stoop to earth. Here, as in Sir Bevis, the knight, nearly overcome, is healed by a holy well, nay more, nearly overcome again, falls with equal luck beneath the Tree of Life and is made whole by its fruit, a detail taken from the legend of St. George. The dragon is wounded—and black gore gushes from him enough to turn a mill. Finally the mortal stroke is given through the mouth, and dragon and canto end. This is a real fight indeed, and impresses itself upon, truly thrills the reader. Importunate allegory is forgotten—and who cares if critics have pursed their lips over the poet's "extravagance." Surely here Spenser has succeeded in his ambition; he has "o'ertopped Ariosto."

There is in fact nothing to compare with it in Ariosto, or the other Italian poets who in exquisite verse revivified the fading colours of old romance, often achieving beauty, sometimes, even in the midst of romantic diffuseness, narrowly bordering on sublimity. Spenser is always dead serious; any apparent humor is accidental. Ariosto you can never be sure of. His brilliant mercurial intellect could not refrain from making fun at times of his own imaginings. This appears in his dragon-fight—the famous episode of the orc in the 11th canto of *Orlando Furioso*. The orc is a huge whale-like creature with tusks and a long tail, derived in direct line from classic sea-monsters. Every day a virgin is exposed for his prey. Rogero dazes the beast with the magic light of his shield, and belabors him furiously with his sword, when the lady tells him to stop

his useless efforts and rather free her from her bonds. Later, the peerless Orlando takes on the task of slaying the monster. He rows a small boat in the monster's path as he comes for for daily meal, dauntlessly steers directly into his mouth, plants his anchor in the tongue and palate of the beast, and in security, while the monster lashes up and down from the bottom to the surface of the sea, hews at his interior with his sword till he dies. After which he swims out with the cable of the anchor and pulls the huge bulk single-handed ashore. A terrific adventure truly—worthy of Ireland where it all happened—but was Ariosto serious? Plainly he was not—he may have intended the situation to tower to tremendous heights, but midway could not help letting himself go, and made it mock-heroic, laughing to himself at the reader who would take it in earnest—while the sage and serious Spenser just succeeds in getting through safely, though veering perilously near the edge of absurdity.

It is a commonplace of literary criticism that in the current of tradition old beliefs survive only if they are capable of being rationalized, made reasonable; or made poetic; or turned to humourous purpose. The dragon cannot be rationalized; he cannot, except in an archaic setting, and then with difficulty, be poetized. The third possibility remains, he can be made funny[1]—we have already seen him on his way to it. Mark Twain's dragon, brought face to face with modern materialism, may serve as a symbol. The fight is a fizzle—his flames are put out in a trice with a fire-extinguisher. In the old doggerel folk play, St. George and the Dragon were turned to uproarious horse play. The Dragon of Wantley became a piece of godless ribaldry. In the fairy-tale itself today, the dragon is turned to good sport. Read for example in Seumas MacManus how the "fiery dragon came up with twelve heads on him and every mouth of him spitting fire and let twelve roars out of him"—or the one that Jack, the son of the King of Ireland, killed, "But lo and behold ye, no sooner did Jack

[1] It has even been suggested, though not in relation to the point here made, that touches of humor appear in the treatment of Fafnir.

come anear the castle than a terrible great monster of a dragon entirely, the wildest ever Jack seen or heard tell of, came out from the castle and he opened his mouth as wide as the world and gave a roar that shook the nails on the toes . . . and rattled the eyes in the sockets of the great grey eagle on top of Croagh-pathrick mountain at home in Ireland . . . and he fell on Jack, and Jack fell on him, and he to it, and Jack to it, and if the fight was wild and terrible the first two days, it was ten times wilder and terribler this day." Kenneth Graham also has a most delectable dragon. I know of but one dragon with claims to serious appeal in modern literature. That one is Lord Dunsany's Tharagaverung. He is a dragon crocodile with back of steel and underparts of iron and a steel strip, Sacnoth, along his back. In only one way may he be slain and that is by starving. His nose is of lead, not to be cut with sword, for a sword would merely shear through to the impenetrable bronze beneath. But to be struck upon his nose causes him intolerable anguish, so that if, by beating upon it with a stick for three days, he be kept from food, he must die. Thus briefly to describe him does not do him justice—he sounds like mere merry nonsense. As a matter of fact he is much more. Plainly in line from the apocalyptic monsters of Scripture, in him whimsical humor and strange beauty are wedded through sheer power of fantasy and a use of symbolic suggestion that no more needs a key than does the evocative enchantment of a piece of fine music.

Such, then, briefly sketched, is the story of the dragon. Such is his end in jokes and laughter. Imaged in art, he can remain an appealing convention, or, in the far East, much more than that—grotesque, bizarre, magnificent in form and color. In literature, he has come to be turned to caricature, parody, foolery. Strange to think he was once terrible, a reality that stilled men's hearts with dread. After all, there is only one way in which old beliefs can really live on, and that is by the meaning, the poetry, the beauty, there is in them. Poetry he had in him, still may have in him, but only in a fixed relation, a fixed setting. Terror and horror are proper to

poetry surely, but they cannot inhere in forms that have grown to seem too bizarre and monstrous. The centaur, a shape of beauty and strength, is measurably free from the limitations of time. The goat-god, Pan, once a bestial and hideous deity that might well inspire the Panic terror, through the elements of beauty that grew into him and the purging of that which was gross, has had, in our day, a score of poetic incarnations, not forgetful of his ancient beauty and his fear. He has become a symbol of nature, of a pagan joy in life, even, in a notable essay of Clemenceau's, of natural science as opposed to superstition. But the dragon, once a haunting shape, potent for evil, a phantom of the mind, then strangely composite in varied forms, for all his parade of natural and supernatural terrors, had no vital, abiding meaning that time could save. He remains, today, static, a quaint archaism, a trite metaphor, a toy for trifling. One doubts if even genius could find for him, today, in his proper self, an avatar.

FLAVIUS JOSEPHUS THE JEWISH HISTORIAN

By James A. Montgomery

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There are three factors in a production of historical art which, if found in combination, make it of supreme interest. First, there is the worth of the field studied, if this be to any degree adequately honored by the historian. Secondly, there is the representative character of the historian, whether he be qualified to speak for his people and age. This element may indeed transcend the first in its value of reflecting the genius of the race or the spirit of the times. And thirdly, there is the personal element, in case the author is well known, and especially if he makes himself known through the course of his writing. This factor makes the history an autobiography, probably the most important kind of history. It enables us not merely to hear the story told but to know the story teller, so that knowing him we can the better criticize his art, while, what is still more impressive, the charm of a human life resuscitates the bones of a buried history.

All these factors are contained in the historical work of Flavius Josephus, even if they have not always been diagnosed. His worth as a historian has been amply studied, appreciated or depreciated. In matter of fact he is our sole continuous authority for the two most momentous centuries of Judaism. But even if his worth is discounted, he stands forth as the one orthodox Jew of the first Christian century whose life we know at length. He was a foremost actor in the stirring and tragic times which his pen describes. He had the learning and the traditions of his race and religion at his command. He is the one Jew who attempted such a monumental work as he accomplished in the field of history until we reach the nineteenth century. And he wrote it when he saw the curtain fall upon

Israel's greatest tragedy. A man in his personality, a diplomatist and soldier of distinction, a scholar and a student of Jewish learning and a dilettante of the world's literature, a representative of his people's religious genius, he was uniquely qualified to speak the mind of that people at the moment it was passing into the age when it lost its historic consciousness.

Joseph the son of Matthias (his cognomen would then be Ben Mattai) was born in Jerusalem A. D. 37, the year in which Saul of Tarsus became a Christian. He was of priestly stock, of the first order, and was descended through marriage from John Hyrcanus, the great Hasmonæan king, and no little proud was he of his high lineage. He had a thorough Rabbinic learning, and boasts conceitedly how when a young man his advice on matters of the Law was sought by the doctors. Between the years of sixteen and nineteen he cultivated the delights of religious experience and tried out the different schools of his religion, the Pharisees, Sadducees and Essenes, and also spent a novitiate with an ascetic hermit. As a result of this comparative quest he became a convinced Pharisee, although his early experiences enabled him always to look with sympathy and impartiality upon the varieties of Judaism. At twenty-six he went on a semi-diplomatic voyage to Rome to obtain the release of a captive cousin priest, experiencing shipwreck on the way in the Adriatic Sea, gained the favor of the notorious Poppæa, wife of Nero, the patroness of the Jews and returned home successful. In 66 the Jewish revolt broke out, and, outraged by the indignities to which the Jews had long been subjected by profligate and inhuman governors, he appears to have thrown himself wholeheartedly into the cause. He was made the general of the Jewish forces in Galilee, and while we have only his word for it, there is no reason to doubt that he acted with both prudence and great courage. He had to contend not only with the wellnigh invincible Romans but also with the miserable factions and jealousies among his own people, and apparently acquitted himself with success. In the following year the city Jotopata, which he was defending, fell after a gruelling siege and he escaped from a suicide compact

with a few survivors hidden with him in a cave only by some astute practice on his part. He finally surrendered himself to the Romans, and was brought before Vespasian, whose favor he gained by prophesying to him his coming imperium. Upon its accomplishment two years later the new emperor gave him his liberty. In gratitude for the boon Joseph assumed the family name of the new dynasty, becoming Flavius just as Saul assumed the name of his patron Paul. He went off with Vespasian to Alexandria, but was summoned back to Palestine by the emperor's son Titus, who was proceeding to invest the city of Jerusalem. He doubtless desired to use Josephus as a diplomatic agent with the rebels, for he was fully aware of the military job before him. Josephus was present throughout at the siege, did what was in his power in counsel to the defenders to surrender, and witnessed its awful fall. Of this soul-racking scene Josephus is our sole witness, for the tragedy entered into his soul, while the mute but eloquent witness to it in stone is the Arch of Titus in Rome. He then went with Titus to Rome, was assigned quarters in one of the imperial palaces by Vespasian, receiving also Roman citizenship, a pension, and estates in Palestine. Here he lived in ease and occupied with literary labors until his death, which occurred early in the second century. He was married four times and two of his wives he divorced. His life, if not a long one, was certainly full of variety and adventure.

Such a wealth of biographical detail, as suggested by this sketch, displays a man conscious of his own importance. He was indeed an egotist by nature, and this characteristic was only aggravated by the experiences he had passed through, as a born aristocrat, a scholar of the rabbis, a political and military leader, a friend of kings, a successful bookwriter—which more than aught else tends to conceit. But if he is garrulous about himself, it all shows us the man, and we must remember that conceit was almost the necessary characteristic of anybody who would be somebody in the early Empire. One critic has suggested that Josephus must have been a man of commanding presence and evident ability to explain the favor

which he possessed with the Flavian emperors. He evidently carried himself in such a way as to rise far above the treatment allotted to the raft of literary menials who thronged about the tables of the powerful in Rome.

In religion he always remained a convinced Jew. He wrote his Antiquities to exhibit the Jews as the oldest and best of peoples, and his Apology against Apion is one of the finest pieces of writing of the kind we possess from the Bible religions. His formal adherence to the religion of his fathers, which he defended with both intellect and enthusiasm, was filled out with a genuine personal piety, and his writings are worthy of study for the unique picture they give of the inner religion of a Pharisee of the day of the Gospels. For this he deserves the serious attentions of both Jew and Christian, for to both subsequent developments have made Pharisaism too much of a conventionalized figure. He is a foil to the idea we get of the Pharisees through the New Testament, in part approving that idea by his self-satisfaction and self-righteousness, yet amending it by the picture of a very genuine piety which had faith in the providence of a good God. On the other hand his sympathies as a man of the world and of good culture reveal a Pharisaism of the first century of a broader make than that which appears in the later dry channels of Talmudism.

The one great score made against his character, that which no Jew can forget, is his forsaking the cause of his people in the hour of its greatest crisis, and his gaining wealth and favor by his defection to the enemy. I can appreciate the indictment for I too am a patriot. But it is the province of the historian to be fair. Josephus had gone into the revolt as a patriot, although his reason must have shown him the hopelessness of his cause. He pursued his duty as military chieftain of Galilee to the bitter end, until he was starved out in the city which he had defended to the last. He had the choice of suicide or surrender, and he chose the latter. He gained the favor of Vespasian by prophesying for him the emperorship, while it may be remarked that he was possessed with the notion that he had prophetic powers. This showed

him the way to imperial favor, and he remained ever after a petted courtier of the conquerors. And later in his life he writes his autobiography as an apology against his personal enemies who had been showing up his career as an opponent of the Romans in the war in Galilee, and there he weakens to the extent of making himself out as having done the best he could for the Romans, that is, that he played a double part. The original history, as given in his Jewish Wars proves the reverse, that he fought as a gallant soldier and patriot until he was taken an honorable captive, a prisoner of war. For this perversion of history there can be no excuse; fortunately we know from his own pen both sides of the story. One is reminded of the development of character that is portrayed by George Eliot in Tito Melema, where one lapse leads to another.

So far condemnation of Josephus's character as it came to be is fully justified. But the change of attitude towards the fanatics in Jerusalem who guided their ship on the rocks like the Bolshevists of modern Russia is a political not a moral problem. However he came to the conclusion, he was justified in seeing the Holy City marked for destruction by the finger of God because of the mad folly and the blasphemous excesses of its defenders. In secular terms it was another edition of the Paris Commune or, more generally, a repeated chapter of the days which brought down upon the monarchy of Judah the destruction wrought by Nebuchadnezzar. What the Jewish Prophets, two of the greatest of them, thought of the guilty city is part of the Hebrew Bible. Jeremiah preached that God would destroy the temple, Ezekiel saw the vision of the Glory of the Lord departing from his Holy Place. Josephus stood in their tracks when he saw God himself fighting against his people, as he says, and announced that the empire of the world had gone over into Italy, just as long before Babylon had been prophetically hailed as the divinely appointed mistress of the world. We must give Josephus this credit that in the camp of the Romans his intelligence recovered its balance and that he interpreted the inexorable advance of the Romans

as the certain sign of fate. He felt that the Zealots, Innovationists, as he called them, did not represent the cause of their people or their God and he condemned them. And history shows he was right. But the black mark remains that unlike Jeremiah and Ezekiel he did not remain with his own to comfort and exhort but betook himself to the captor's good graces. He doubtless would have had his throat cut if he had remained with them; Jeremiah, according to Jewish tradition, was martyred by his people; and we are not all cut to fit the martyr's crown. But withal he remained a faithful Jew, in the day when to be a Jew was not popular. He was one of the many who had to prove and learn that Judaism could exist without its Zion. But the innate patriotism of the man rings out in the pathetic cry to Jerusalem: "Oh, mayest thou grow better again, if ever thou canst propitiate the God who destroyed thee."

Josephus was thus a maker of history. I turn to him now as the historian. We are most fortunate in his case in possessing not only four complete works of his but also very ample data about their composition. The layman hardly enough realizes that we possess only fragments of the great literature of classical Greece and Rome and that for most of this we have but the scantiest information as to the authors and the circumstances of their composition. Such data can often be gathered only from the notes of later scholiasts and commentators. But Josephus's egotism has enriched our literary knowledge to an extent that throws a welcome light upon the whole art of bookwriting in the Roman Empire.

Four works of his have survived, all written subsequently to the fall of Jerusalem and in the following order: The Wars of the Jews; the Antiquities of the Jews; the Life, or Autobiography, as we would call it, a supplement to the Antiquities; and the Apology against Apion. The latter work, whose real title is, On the Antiquity of the Jews, or possibly simply, To the Greeks, in addition to its eminent character as a defence of Judaism against Pagan attacks, is historiographically of value because of its inclusion of many historical and traditional

data. Two other works of a philosophical character have been falsely ascribed to him, one the Christian apocryphon, Fourth Maccabees, the other On the Cause of All, probably written by the Christian Father Hippolytus. He also prospected an ample work, as he tells us, on the Jewish Doctrines about God and his Being and the Laws, which unfortunately was never written. These books, as now existent, were all written in Greek, and they have been preserved by the Christian Church for the Jews out of their hatred of the author ignored his works. It is the literary interest of the Christians which has preserved to us almost all the Jewish literature that has survived from the century before and after the birth of Christ.

The Wars of the Jews was first composed, as he tells in the Preface, "in the language of our country," that is, doubtless, the Aramaic, the language of the Aramaic portions of the Old Testament and the speech of our Lord and his contemporaries in Palestine. It is a vast pity that this original draft has perished, for we possess only the scantiest remains of the Aramaic of that age. He wrote it for the Jews in Mesopotamia, doubtless with the purpose of informing them more exactly about the great war and his own part in it. Our present work is a translation into Greek, as he tells us, doubtless with expansion. In another place he states that for this Greek edition he "made use of some persons to assist me in learning the Greek tongue," which language he says again, he never "learned to speak with sufficient exactness." The statement recalls the distinctly literary aim of all composition in that age; a book had to be rhetorically correct, whatever its truth or worth might be. This was a characteristic of most of the Jewish Hellenistic literature of the age, an unfortunate aping of the Alexandrian and other decadent schools of rhetoric of the day. We might wish that Josephus had written his histories in the simple vernacular Greek of his day, like that which appears in the New Testament. But no, he had to make himself a Greek to the Greeks and prove that he could write in the artificial rhetoric of the age. Hence we have compositions of clumsy involved Greek, disfigured with affectation and exag-

geration, a feature that is apparent in the well-known English translation by Whiston. But in this we are not to blame the Jew but his Grecian masters in literary taste.

In the same Preface to the Wars he sonorously says: "I do dedicate this work, as a memorial of great actions, both to the Greeks and to the Barbarians," language which reminds us of the cosmopolitan purpose of the Apostle Paul. And the opening words of the book swell with the high dignity of his subject, so that we think of Gibbon when he undertook to write the history of the similar tragic fall of a mightier empire: "Whereas the war which the Jews made with the Romans hath been the greatest of all those that have been in our own times, and also, you might say, of those that were ever heard of, . . . therefore I have proposed to myself to translate these books into the Greek tongue."

This history is divided by the author in seven books. The first covers the preceding history from Antiochus Epiphanes to the death of Herod; the second records the events and causes leading to the great revolt in 66 and carries us down into its second year; the remaining books tell the story from Vespasian's arrival on the scene till the destruction of Jerusalem and its sequels. Josephus presented the work to Vespasian and Titus, it was accompanied with high recommendations from the younger King Agrippa, and Titus with his own hand ordered that it should be published.

From this partial history of his people, of the scenes in which he had been an actor and eyewitness, he proceeded to a more ambitious work, a complete History of the Jews. The Greek title is the Jewish Archaeology, which has been rendered into the Latin and modern languages as the Antiquities of the Jews. We might translate it as the Ancient History of the Jews; he probably imitated the Roman Archaeology of Dionysius Halicarnassus in twenty books. We have to recognize this flavor in the word that the work was an argument to prove that the Jews were a most ancient people, indeed with their historical traditions the most ancient of all peoples. It is a worthy history, he claims in his preface: "It contains the

history of 5000 years, in which time happened many strange occurrences, many chances of war, and great actions of commanders, with mutations of the form of our government." Hence, he says: "I have undertaken the present work, as thinking it will appear to all the Greeks worthy of their study, for it will contain all our ancient history and the constitution of our government." But he writes the history in the spirit of the Biblical theologians, with full belief in providence and theodicy. The reader of this book, he holds in the Preface, will learn from it that all events succeed well to an incredible degree to those that follow God's will, but, for those that disobey, whatsoever they set about as a good thing is converted into an incurable calamity. And so he adds: "I exhort all those who peruse these books to apply their minds to God."

The work is thus of apologetic character, and while this conditions its historical value, we must recall that without this motive it would never have been written. It is an undertaking that belongs to a large category of literature of the Hellenistic age that sprang up from the reaction of the Orientals against the arrogance of the Greek culture, which affected to be the first and the best in the world. Manetho of Egypt and Berossus of Babylonia had written similar historic defenses of the antiquities of their countries three hundred years before. Smaller states, like the Phœnicians, produced similar histories. Jewish writers had followed in the same tracks, as we know from their literary fragments. Indeed I am inclined to think that the late book of the Chronicles was composed in somewhat the same spirit. And with Josephus there was the further religious motive of the defence of his native religion which was exercising its active propaganda over the world, and of his people, which maintained its Semitic identity although scattered through the nations.

Anti-Semitism is as old as Alexander's conquest. The Jews were not liked. They formed large and unassimilable communities in every great city, living of their own choice in ghettoes, which are not the result of Christian compulsion. They were prolific in consequence of their superior morality

and hygiene; they were as Orientals peculiarly successful in business, and they flaunted in the face of the easygoing world a religion which brooked no compromise, a religion that broke right through the common institutes of society with its laws of circumcision, taboos, sabbath observance, which kept them from assimilation with their neighbors. In general as under the immediate protection of the political powers, which they knew how to secure, they were the immediate protégés of the empire and so were rendered less dependent on the provincial administration, and by reason of their cosmopolitan character they were found useful agents of the imperial administration. But this peculiar favor did not increase the love of the demos for them. Nor can it be denied that they were aggressive and turbulent, contributing their share to the mob fighting which disgraced the great and little cities of the empire and which had its remarkable expression in the Jewish revolts that broke out over the empire in connection with the rebellion in Palestine, all the way from Cyrene to Mesopotamia.

For such reasons the Jews needed an *apologia* and Josephus is worthy of all praise for entering into the lists for them and producing the able defences he made. This is his special motive in the so-called Apology against Apion, where we see as in a mirror the fierce antipathy of the Pagan citizens of Alexandria for the Jews, descending to the lowest forms of slander and scurrility, to all of which Josephus opposes a strong and logical argument for the absolute superiority of the Jewish religion and the unimpeachable character of its morality. If he was not able to diagnose the popular feeling against the Jews, that was because he was a Jew and was sincerely convinced of the cause of his religion and people. Where then he does criticize the actions of some of his compatriots, as in his acute remarks upon some of the Pharisee politicians or in his condemnation of the "Fourth Party," the Extreme Left, as we would call it, which brought on deservedly the ruin of Jerusalem, he is not to be idly disregarded by the Jewish critic, but his opinions should be weighed as from one who never blamed his own except in the inescapable truth.

The first eleven books of the Antiquities cover the ancient history following the Bible story. The twelfth to the seventeenth bring the history down to the death of Herod the Great. The three remaining books are a summary account of what he had told in the Wars.

His Life which is a supplement to the Antiquities is an apology for himself against the Jewish enemies who tried to asperse him as a Jewish rebel to his Roman patrons. It is of value for its autobiographical details of the beginning and end of his life. But the body of the work reflects no credit upon him for it is an argument to show that he was not the singleminded brave soldier in the Galilaean wars which his earlier history had made him out to be. According to this defence he was then playing a double part. But rather it appears that the older pampered countier Flavius was lying about the young cavalier Josephus, and we prefer the latter.

Down to very recent times the Antiquities was regarded by Christian readers and students as the great historical supplement to the Bible and it has had accordingly a tremendous vogue. Uncritical opinion accepted all it narrated and it was thought that whatever was not found in the Bible could be authoritatively had in Josephus. Historical criticism has done away with this credulous attitude, but it has swung the pendulum too far in the opposite direction, that of an uncritical distrust of Josephus. And yet he remains our one and chief historical authority for the last two centuries of Judaism before the fall of Jerusalem and so for the background of the origins of the Christian Church.

Fortunately we are able to diagnose his sources, largely through his own data, and also to estimate the value of his record in the various sections of his history. He continuously names his sources, and among these for the latter part of his history are such eminent Greeks authorities as Polybius, Strabo and Nicolaus Damascenus, the courtier and biographer of Herod the Great, who wrote a universal history in 144 books. We owe it to Josephus in large part that we possess the fragments of these historians whose works are now largely

lost. Of course where such sources are named or are visible Josephus's authority is enhanced by more than his own name.

As to the sources which he does not name or which we cannot control, we are thrown back upon the need of acute criticism. It is to be said for Josephus that at least he possessed the ideal of historical veracity. In the Prefaces to both his histories he sharply condemns the false historians of his day, wherein we are reminded of the similar criticisms levelled by Polybius against his historian contemporaries. He diagnoses in the Preface to the Antiquities the faults of his brother historians, how some apply themselves to the subject as a rhetorical exercise, and others would gratify their patrons, while others write history for self-laudation or self-excuse. At least Josephus knew something about the theory of true history if he did not live up to it.

A sharp distinction is to be made in his reliability at the point in the second century B. C. where, setting in with 1 Maccabees, he can pursue the story of his people by means of authentic native and international sources. For the internal history before his day in this period he had the extensive work of the intimately informed Nicolaus of Damascus, and so for the period about the beginning of our era there is no question about his general reliability; thus he remains our one historical source for the history of the Jews in this most critical period of their history. For the history in which he was a participant he appeals to the fact that he kept written memoranda of the siege of Jerusalem and was able as the go-between for the Romans to obtain information on both sides. In this he shows the knack of the true historian.

But for the long era before the age of the Maccabees, that for which the student of the Old Testament desires a supplement to the Biblical story, Josephus's reliability is up in the air. He has not the critical ability to distinguish between the true and the false. Any written legend or tradition if usable and flattering to the Jews he accepted without question. As a compilation of sources his Antiquities, as also his Apology against Apion, is invaluable for its preservation of the frag-

ments of a vast and now lost literature. But most of this material is only of most indirect historical value. In all this Josephus was a child of his time both as Greek and Jew. A few of the great historians of the first century have been preserved to us, but we forget the mass of pamphleteer history writing which disfigured the age, and which had its home mostly in Alexandria, that concourse of Europe, Asia and Africa. If Josephus took their stuff it was the kind of stuff the age liked, wherein that age was not much worse than the twentieth century. Not Thucydides, Polybius, Tacitus were the masters but those small-minded history-murderers whose names have only survived in adverse criticisms.

And then as a Jew Josephus suffered under similar limitations. With the Exile in the sixth century B.C. the Jews lost their historical sense. The Hebrew ability to write history is revealed in the books of Judges, Samuel and Kings, But with the exception of 1 Maccabees the Jews never again produced a real history. History was replaced by artificially colored religious fiction, such as the book of Chronicles or Esther or 2 and 3 Maccabees. In this Biblical literature we have the beginning of what is called Haggada and Midrash, which was to replace history in Jewish literature, a kind of religious Arabian Nights Entertainment. In fact Haggada in its most exaggerated forms appears in the legends of his people which Josephus cites without question, the most absurd legends about Abraham and Moses based doubtless on large compilations of such stuff, the art of which has been preserved in the book of Jubilees, the Testaments of the Twelve Patriarchs and the vast mass of Midrashic literature.

Josephus also cannot be excused from compounding the stubble of idle legend he used with the sacred history, for which at least he had his authoritative sacred books, and giving all without distinction the halo of sacred authority. He will write up in most approved Midrashic style some Biblical story and then give us to understand that he found it all in the Bible. He puts lengthy orations and philosophical discussions in the mouth of his Biblical heroes with the appearance as though

from the same authority. But this was a common trick of the ancient historian. Where Bible ends, on which score he can make a reasonable appeal, as the most ancient of books, and where legend begins, he defines not. Even when he tells us he translates from the Hebrew original, we find that he has been using the Greek translation.

Josephus was limited both by race and environment. His Greek culture enabled him to write a history of a scope and a value which no other Jew ever attempted till modern times. His self-conscious Judaism was the motive of it. His faults are those of both the Greek and the Barbarian of his age. He failed in the lack of critical ability, but we cannot judge him from modern standards or of those of the ranking classic historians; we are to be thankful that he wrote history at all. He exceeded the mark in the over-glorification of his people, but we can excuse his vigorous championship in a day when none had a good word to speak for the Jew. Jerome called him the Jewish Livy, and such he is as to the scope of national history he projected. We might think of him as the Jewish Thucydides, not in his art but for his fate in writing the history of the national tragedy in which he was a participator. But taken by himself he stands unique in Jewish literature, and if he has given us much chaff with the wheat at least we must credit him with his largess of the wheat.

THE RAILWAY PUZZLE

By Emory R. Johnson

Professor of Transportation and Commerce
and Dean of the Wharton School

Editor's Note—The lecture on the "Railroad Puzzle" was delivered in January 1920 when there was pending before the Conference Committee of the Senate and House the Cummins Bill that had been passed by the Senate, and the Esch Bill that had been passed by the House, each following a different plan for the government regulation of the railroads. At the time the lecture was given, the public was considering the various principles and policies of railroad regulation, and the purpose of the lecture was to simplify, if not to solve, the problem then under consideration.

The following month the Transportation Act of 1920 was passed, and the various questions that were considered by Dean Johnson in his lecture upon the "Railroad Puzzle" were disposed of. For that reason it does not seem necessary to include the lecture in this volume. Dean Johnson, after stating what he conceived the railroad puzzle to be, explained briefly how the present railroad situation had developed during the European War, when the government took over the operation of the railroads. The reasons that led the President to take over the operation of the railroads under powers that had been granted him in 1916 were set forth, but the wisdom of the policy of direct operation of the railroads by the Government was questioned by the speaker. The main facts as to the results of government operation were enumerated, and a brief analysis was presented of the several plans that had been developed for the future regulation of the railroads by the Government, that is, for the solution of the railroad problem.

The main differences between the Cummins and Esch bills were set forth, and the speaker expressed preference for the Cummins Bill, which in his judgment was based upon sounder principles of railroad regulation.

The lecture closed with the statement that the fundamental issue was between government ownership and private ownership, and the opinion was expressed that to be compelled to adopt government ownership would be a national calamity. It was stated that the vital question to be solved, after having decided upon corporate ownership and operation, is how to restore and stabilize railroad credit. It was pointed out that this would require a large increase in the revenues of the railroads, without which the carriers would be unable to serve the public adequately and efficiently.

G.E.N.

THE SEEDPOD OF SHAKESPEARE CRITICISM

By Felix E. Schelling

John Welsh, Centennial Professor of History and English Literature

The title of this lecture, The Seedpod of Shakespeare Criticism, was suggested long ago by that most obvious of disparities, the difference between an oak and an acorn. Though if the origins of comment on Shakespeare and his work are to be likened to an acorn, we shall have to find something more tangled, confused and impenetrable, something less dignified than an oak, properly to figure forth that dense, overgrown and fanciful jungle, Shakespeare criticism. Paths there are few through it, and these are wandering and zigzag. Much of its growth is like the upas tree, sprouting upward to impede and downward to entangle, illogical, presumptuous, unnecessary, a good deal of it, and uninformed. Yet all these fronds and dangling vines, with some sound growth as well, have sprung from some seed and as we follow back in imagination we come closer and closer to the simple beginnings whence it has all come.

Many years ago, when bicycles were in vogue, I was captured, one fine summer day, by a sometime student of mine who was then the president of a freshwater college up the state. He has since degenerated into a politician—but academic degeneracy is not the topic of this lecture. Small clothes and all, I was carried into a big auditorium to talk, on a few moments' notice, and I asked for any copy of Shakespeare that might be at hand. I had in mind that prefatory material to the first folio of the plays about which everybody knows and which few people have ever read. Though possessed of numerous editions of Shakespeare, not one book could be found in that college which reprinted this ancient

material, and I naturally talked about something else. Later, investigating the matter, I realized that this introductory material of the old folio was seldom if ever reprinted in modern editions of Shakespeare, as every editor was anxious to write something prefatory of his own. We could perhaps spare the dedication "To the most noble and incomparable pair of brethren, William Earl of Pembroke, etc., Lord Chamberlaine to the King's most excellent majesty, and Philip, Earl of Montgomery, etc., gentleman of his majesty's bedchamber, both knights of the most noble order of the Garter and our singular good lords." It is admirably written in the eulogistic manner of the time, which, like its towering ruffs, its beaded and brocaded jerkins and stomakers and farthingales, elaborately concealed much of the real men and women beneath. But can we spare from the book that reprints the words of our Hamlet, our Falstaff and our Imogen, the vivacious preface, "To the great variety of readers," an address which includes everyone of us, my friends, "from the more able (which, means all of you) to him who can but spell?" Can we spare the fine lines "To the memory of my beloved, the author, Master William Shakespeare and what he hath left us," penned by the greatest poet, dramatic or other, who survived Shakespeare in his day? Even the lesser praises of two or three minor men are not impertinent, to say nothing of the Droeshout portrait of the title page and Jonson's epigram about it "To the Reader." When my friend, Professor Neilson of Harvard, now president of Smith College, yielded to the blandishments of a publisher and edited *The Complete Works of Shakespeare*, exceedingly well but printed in that wicked wise, the double column, I expostulated with him for this omission, which I am glad to see that he has corrected; and now at least in one modern edition we may read our Shakespeare as he came from the press and find these opening passages which, albeit his pen did not trace them, are yet as veritably a part of his book as Marc Antony's address to the populace of Rome over the body of the dead Caesar or as the sleep-walking scene in *Macbeth*.

A book, handed down for generations without its true title, without dedication, preface or recommendation, can we wonder that "seeliest Ignorance" has found something suspiciously irregular in such a publication of Shakespeare's works? I will not say that Baconianism and other like nonsense is founded on that omission, for Baconianism is prodigiously learned—only perversely learned in the wrong way. But it is not to be questioned that we have lost much of the historical atmosphere of this most important book by this particular sin of omission, and by our editorial disregard of the apparatus with which the famous volume was first issued to the world.

Now if there is anything concerning Shakespeare about which we may be permitted to be certain, it is the circumstance that there is absolutely no mystery about him or the publication of his plays. All the mysteries are of our own making. Shakespeare's collected works—for with these alone are we concerned—were published seven years after his death, (a remarkably early publication), under conditions so simple, so obvious, so understandable that anyone, knowing the practices of the time as to publication could have predicted them, one and all. May I epitomize the old story? Shakespeare died in 1616, the second member—that is the second largest stockholder—in a theatrical company which may be described as Burbage, Shakespeare, Heminge and Company; and another player, named Condell was the treasurer of the firm. Burbage, greatest actor of the age, followed Shakespeare to the grave in 1619; whereupon the firm name might be read as Heminge, Condell and Company. Today, when a merchant dies, his heirs inherit his stock in trade in the firm. In Shakespeare's day, such property was commonly apportioned among the surviving firm members. Wherefore all the plays which Shakespeare had written for his company, The King's Men, became vested in Heminge and Condell. Now turn to the omitted prefatory material of the famous first folio and you will find both the dedication and the address "to the great variety of readers" signed "John Heminge and Henry

Condell," for they with their fellows were as veritably the owners of the plays of their company which were as yet unprinted, as they were the veritable owners of the Theatre on the Bankside and their other house in Blackfriars.

But the plays as yet printed were by no means all of them. In Shakespeare's time, there was no such thing as a copyright. The booksellers had adopted an arrangement in the Stationers' —that is Booksellers'—Register, by which they protected themselves against each other. A phrase of the day was "escaped into print," and when a book had once "escaped into print," its own author had no warrant in law or in equity to claim it. About half of Shakespeare's plays were printed in his lifetime, often in the first instance against his and his company's will, though at times with permission, and even in rivalry with "stolen and surreptitious copies." More of Shakespeare's plays were printed and in a greater number of editions within his lifetime than the plays of any other playwright; and for the simple reason that the Elizabethans appreciated Shakespeare above all other men who wrote for the stage and liked to read him as well as see him acted. The printed sources of the folio were owned by some eight or ten printers who had come by them variously; so to adjust the claims of all, a syndicate was formed, headed by the printers, Isaac Jaggard, the King's printer, and Edward Blount, the most prominent of contemporary book sellers, to combine with Heminge and Condell, the theatrical owners, in the collection and publication in one volume of everything which Shakespeare had written. Look now once more at the neglected prefatory material of this book, and the title page will disclose to you "Mr. William Shakespeare's Comedies, Histories and Tragedies published according to the true original copies, London, printed by Isaac Jaggard and Ed. Blount, 1623."

And now a question arose. Neither Heminge or Condell was a writer, and such a book ought to be properly introduced. In such a juncture there could be no choice. The best book of the hour demanded sponsorship by the greatest contemporary man of letters. Ben Jonson was the King's poet, the lau-

reate, the literary dictator of the age; and Jonson rose nobly to the task, penning not only the epigram "To the Reader" and his noble personal eulogium, but both the prose addresses of dedication. Of this matter there can be no question whatsoever; the style and phraseology of both disclose the author; and if anyone is troubled by the signatures of Heminge and Condell, appended to two addresses which neither of them actually wrote, let him examine into his own conduct in the matter of circulars, resolutions, and other papers which he has had written by skilled competence for the appendage of his signature. There was no deceit in the practice and none intended.

The famous first folio of Shakespeare is not a notable specimen of book printing. The age knew handsomer volumes and more correctly printed ones. But save for Ben Jonson's own folio of 1616 (and Jonson was a bookish man), nobody's plays had ever been collected together for print in England up to this time. The age must have thought something of these productions so to collect and publish them. It would have been a wonder if Ben Jonson had critically edited them, for nobody then did such a thing for any author save an ancient classic; and it would have been a miracle if anyone had so anticipated his age as to have prefixed any account of the author to his works. Everybody knew Will Shakespeare; why write about him? As yet it was only the author's picture, not his life, that was taken; and the Droeshout portrait, such as it is, we have.

But we have forgotten our seed pod? By no means. We have already cracked the outer shell of it. To return to the path, there is scarcely anything about the Elizabethan age which is more astonishing than the existence in it of so many men who were great in things which Shakespeare, with all his universality, does not touch. Leaving out of consideration Spenser, who is medieval, allegorical, metaphysical, manipulatory of scholarly and classical material, all of which Shakespeare never is, we have Hooker, Bacon and Jonson, each an intellectual giant and in a sphere, each his own and wholly

alien to Shakespeare's. Hooker is the great master of church polity, formal logic and philosophic reasoning, a pure and beautiful spirit, deeply religious, even more deeply theological. Now, do you know the form of Shakespeare's religious faith? What exactly was it that he believed and disbelieved? Was he a high churchman or a low? Was he a dissenter? and from what? There were many sects in his day. An old play thus reels them off: "Papist, Protestant, Puritan, Brownist, Anabaptist, Millenary, Family o'Love, Jew, Turk, Infidel, Atheist, Good-Fellow, etc.:" was Shakespeare any of these? except the last in a sense quite untheological? You will find so much religion in him and so little theology, be it remarked, that you may perhaps take him to be of your own particular sect. He has been thought by some to have been a Roman Catholic. He venerates what is beautiful and touching in the old faith and is tender with its clergy. But to the credit of human discernment, as Professor Raleigh has wittily put it, as yet nobody has declared Shakespeare to have been a Puritan.

Bacon was the great questioner, the man of science and classification rather than the metaphysician; in his lesser walks in life, the lawyer, the courtier, the diplomat, moving perilously among the pitfalls and falling into one of the most despicable of them, that of bribery. It is amazing that these two men, Shakespeare and Bacon, could have been each so great in his seemingly universal sphere and yet so in contrast. Bacon was well born, superbly educated, subtly skilled in diplomacy, statecraft, and the ways of courts; critical, self-seeking, aristocratic, ambitious of worldly advancement and of fame, grasping the known sphere of human knowledge as his by prerogative of the intellect. Shakespeare was of humble birth, educated more by means of an "experiencing nature" than by schools or books; one who loved in his day both "cakes and ale" and disdained not the acquisition of "lands and beeves," but to whom there was likewise ever present a world of the fancy wherein disported Puck and Ariel, a greater realm of the imagination out of which to conceive the highest poetry that has yet come from the brain of man. Shakespeare's sphere

is no less complete than Bacon's, and it is far more permanent. Shakespeare's was not the world of human knowledge with its limitations and its provisional judgments, but the illimitable range of human emotion, human passion and aspiration.

To anybody possessed of the most rudimentary powers of discrimination, the confusion of these two intellectual giants, Bacon and Shakespeare, is the last conceivable of errors.

Ben Jonson offers us still another contrast. Jonson is the man of books, the scholar incarnate, the moralist, the satirist, the caricaturist at times. He sees the world with the narrowed eyes of critical scrutiny; Shakespeare with the open eyes of appreciation, wonder and loving acceptance. Jonson worships cleverness, intellect; he condones knavery and detests fools. Shakespeare cares more for our human instincts and affections, and he hates nobody. Jonson comes dangerously near at times to preaching, even in his plays; Shakespeare is ever the artist, and the artist is antithetical alike to the mere moralist and to the critic. With Jonson criticism enters the field of English letters for the first time; and here begins the opening of our seedpod. When I say that with Jonson criticism enters the field of English letters for the first time, I do not mean to deny the existence of much comment on men and things before Jonson's time; nor do I forget the formal attempts of schoolmasters, preachers, pedants and satirists to tell us exactly how things ought to be otherwise. But there was a new formality in Jonson, not to be found in enthusiastic books like Sidney's *Defence of Poetry*, a new attitude of mind in which a pair of scales is set up on the counter of life and nothing permitted to pass over it until tried in a balance with iron weights, and then appraised, and ticketed. It is a question perhaps if this was much of a gain to the shop. But at any rate it substituted the judicial attitude, which is that of the learned judge on the woolsack, for the simpler associations of equality. Ben Jonson is the first of our authors—though by no means the last—to assume an authority over his readers on the score of being an author. The age was accustomed enough to authority from its lords, its soldiers, its preachers; but why a man should pre-

sume to tell you what you ought to think, because, forsooth, he hath written a book—this was a new doctrine.

Jonson had an opinion about everything. Like a modern economist or educator, you could not have surprised him unfurnished with a theory; and, unlike some of these moderns his theories were based on deep learning and tempered with experience and a judicial attitude of mind. Jonson talked criticism for forty years and his world listened admiringly, happy to be guided in opinion by so wise and clever a man. At The Mermaid Tavern, "The Sun, The Dog, The Triple Tun," later in the Apollo Room of The Devil Tavern, and at the hospitable boards of many "great ones," Jonson supplied his age with criticism of the drama, of poetry, of letters, which the British public now finds in the literary columns of *The Times*, and in journals such as *The Saturday Review* or *The Athenaeum*. The influence of Jonson's theory and practice of literature on his age is incapable of exaggeration. He literally dominated his time. Wherefore the importance to be attached to his opinions. Unhappily Jonson's criticism was mostly talked and only occasionally noted down as in some interesting cases which shall now claim our attention.

In 1619 Jonson, who was threatened with obesity, determined on exercise as a remedy, and set out on foot from London to Edinburgh, stopping for the most part of nights at the houses of admiring friends among the nobility and gentry. It may be surmised that his nights sometimes undid his days; for the simple Elizabethans had not yet learned of the sinfulness of thirst and practiced several methods of alleviating it "with no allaying Thames." In Edinburgh the prominent Scottish poet and laird, William Drummond, entertained Jonson for some weeks at his beautiful home, Hawthornden, and, chatting daily with him, noted the great poet's comments and personal gossip in a precious document which was left by one of his descendants to the Society of Antiquaries of Scotland and which was only printed in its completeness some 230 years after Jonson's death. I should like to tell you of some of the entertaining gossip and comment of these Conversations of

Drummond with Jonson. How he declared that "Spenser's stanzas pleased him not, nor his matter;" that "Marston wrote his father-in-law's preachings, and his father-in-law his comedies;" that "he esteemeth John Donne the first poet in the world in some things" but that "Donne, for not keeping of accent, deserved hanging." Similarly shrewd and terse are the two deliverances of the *Conversations* as to Shakespeare: one is that Shakespeare "wanted art;" the other calls attention to the absurdity of any body's suffering shipwreck on the coast of Bohemia. Here is the critic appraising a trifle, a spot on the sun—and a spot *is* striking on the face of so bright and radiant a luminary. The old age accepted the seacoast of Bohemia and the pistol of Pericles, the sombreros of the conspirators in *Julius Caesar* and the striking clock in republican Rome; but the new critic recoiled at these things and called them a "want of art," that is, a deficiency in artifice and attention to detail, which I am inclined to think we must confess they really are. Jonson nowhere actually criticises Shaksepeare for not writing like the ancients. But Jonson himself, trying to write in a manner which should profit by ancient example and succeeding measurably well, has, from these little observations, come to be taken as the champion of classical ideals as against Shakespeare's unquestionably romantic spirit. Here is the first seed in our pod, by the happy art of generalization soon to grow into much, having to do with allegations of Shakespeare's "carelessness," his "want of constructive ability," (Jonson was both careful and constructive), having to do with Shakespeare's untaught genius (Jonson's genius was nothing if not abundantly taught), and the rest of the innumerable phrases and designations of the school of critical condescension, headed by Pope and Warburton, until Shakespeare became to the former an undomesticated fowl "warbling his native woodnotes wild" and to M, Voltaire "a natural born savage, drunk with the wine of genius." From the abundant outpourings of the school of condescension we have only recovered partially in this generation of ours.

Like Dryden after him, Ben Jonson's common sense was often at variance with his learning; for learning is the acquisition of an uncommon sense, rather than the maintainance of a common one When Jonson died, a note book, a commonplace book, as such were called, was found among his papers. In it he had noted certain passages of his extensive reading among the ancients, translating them into literary and well-filed English and applying them, to certain persons at times. For example he begins a fine paragraph on Dominus Verulanus, whom we call without any warrant whatsoever "Lord Bacon," with these words:

"There happened in my time one noble speaker who was full of gravity in his speaking; his language, where he could spare or pass by a jest, was nobly censorious. No man ever spake more neatly, more presly, more weightily, or suffered less emptiness, less idleness, in what he uttered. No member of his speech but consisted of his own graces. His hearers could not cough, or look aside from him, without loss. He commanded where he spoke, and had his judges angry and pleased at his devotion."

Now this passage is almost word for word a transcription from Seneca the Elder, but not a plagiarism; for an ability "to convert the substance or riches of another poet to his own uses" was one of Jonson's frankly avowed requisites "in our poet," as it is and ever has been a requisite in the honorable guild of authorship. Jonson is merely refreshingly frank about it.

In *Discoveries* you will find much about poetry, about language, style and oratory; and besides, discourse of princes, state and other weighty subjects discussed with the brevity of table-talk and culled, a blossom here, rich fruit there, from Jonson's discursive reading up and down the ages. But the most precious parts of the book are the few little summaries on his contemporaries such as that on the oratory of Bacon just quoted above.

It is in *Timber or Discoveries made upon Men and Matter*, as the whole title runs, that we find the famous passage about

Shakespeare, our fellow country-man, and it illustrates, better than any other, Johnson's scholarly preconceptions, dashed with the lucid intervals of his robust common sense. "I remember" he says, "the players have often mentioned it as an honor to Shakespeare, that in his writing, whatsoever he penned, he never blotted out a line. My answer hath been. 'Would he had blotted a thousand,' which they thought a malevolent speech. I had not told posterity this but for their ignorance, who chose that circumstance to commend their friend by wherein he most faulted; and to justify mine own candor." Here speaks the scholar, the professional, the man who invests his talent, who reprobates the readiness, the spendthrift habits, he would call them, of genius. But immediately Jonson's common sense, which was quickened by a warm heart, asserts itself, and he continues: "for I loved the man, and do honor his memory on this side idolatry as much as any. He was, indeed, honest, (Jonson's favorite adjective for himself), and of an open and free nature; he had an excellent fancy, brave notions, and gentle expressions." And once more the critic gets the upper hand and he concludes, balancing the judicial scales: "gentle expressions, wherein he flowed with that facility that sometime it was necessary he should be stopped. '*Sufflaminandus erat*,' as Augustus said of Haterius. His wit was in his own power; would the rule of it had been so too. Many times he fell into those things, could not escape laughter, as when he said in the person of Caesar, one speaking to him: Caesar, thou dost me wrong.' He replied: 'Caesar did never wrong but with just cause:' and such like, which were ridiculous." Jonson is here alluding to the reply of Caesar to Metellus which in the text which we have reads:

> Know, Caesar doth not wrong, nor without cause
> Will he be satisfied.

And it is quite possible that Shakespeare had written:

> Know Caesar doth not wrong, but with just cause,
> Nor without cause will he be satisfied,

and that he altered the passage, leaving the line imperfect,—a deference to Jonson's criticism, although he may well have meant by "doth not wrong," "do no injury" in which case Jonson's criticism loses all its point. However, be it remembered that Jonson did not publish this criticism. He continues, "but he redeemed his vices with his virtues. There was ever more in him to be praised than to be pardoned." Here is another seed of our pod: Shakespeare allowed with judicial qualification and allowance, the critical attitude of Dr. Johnson and the rout of writers who followed him and are marching in his track contentedly to the present day.

But let us turn back now to the prefatory material of the folio with which we began. The epigram facing "the figure that . . . was for gentle Shakespeare cut" gives us, besides the appropriate accolade of a true gentility in the famous designation "the gentle Shakespeare," the notable advice: "reader, look not on his picture but his book." It were good for us if we followed this advice more often instead of reading—and, alas, hearing even as now—so much about Shakespeare. "To the great variety of readers" addressing us personally, numbering us, in Jonsonian wise, according to our wits and capacities to acquire for ourselves a cheap Shakespeare or a dear Shakespeare (and some of our Shakespeares are woefully cheap); and "then" continues "Jonson, judge" "your six-pen'orth, your shilling's worth, your five shilling's worth at a time according to your divers capacities . . . but, whatever you do, buy." "For," he adds in splendid affirmation of Shakespeare's enthusiastic acceptance by his own age: "Know, these plays have had their trial already and stood out all appeals; and do now come forth quitted rather by a decree of court than any purchased letter of commendation." Then comes the regret which has echoed down the ages, that the author could not have "lived to have set forth and overseen his own writings," and the tribute to his facility as "a happy imitator of nature," a most gentle expresser of it. His mind and hand went together: and what he thought, he uttered with that easiness that we have scarce received

from him a blot in his papers." . . . "And there we hope to your divers capacities, you will find enough, both to draw, and hold you: for his wit can no more lie hid, than it could be lost. Read him, therefore; and again, and again; and if then you do not like him, surely you are in some manifest danger, not to understand him." This last seed for the guidance of readers of our great poet I should rate above the largest and dullest book that has ever been written on that favorite but supererogatory topic: How to Study Shakespeare.

And now our great first laureate in Shakespeare's praise takes about him his singing robes and attires his head with the laurel, his lyre in hand. But the flowers of his eulogy are ever rooted in the wholesome soil of judicious criticism. I should like to read you every word of this splendid poem. "To the memory of my beloved author the Master William Shakespeare and what he hath left us" because I know—to perpetrate an Irish bull—that only those who have never really read it can possibly object to hearing it again. But perhaps we had better go on picking out our seeds and kernels. Jonson opens his poem with the frank statement that Shakespeare's works are so superlative in their excellence that "neither man nor Muse" can overpraise them, and then settles the question of Shakespeare's reception by his contemporaries with the affirmation "tis true and all men's suffrage." Next he names Chaucer, and Spenser,only to declare these, "great but disproportioned Muses" as compared with Shakespeare who, contrasted with his "peers" in the drama of his own time, the critic affirms "outshines" them all. Allowing Shakespeare's "small Latin and less Greek"—which makes his achievement only the more remarkable in Jonson's eyes—the eulogist rises to even a higher comparison and still addressing Shakespeare, calls forth:

> Thund'ring Aeschylus,
> Euripides, and Sophocles to us,
> Paccuvius, Accius, him of Cordova dead,
> To life again, to hear thy buskin tread,
> And shake a stage: or, when thy sockes were on,

Leave thee alone, for the comparison
Of all, that insolent Greece or haughty Rome
Sent forth, or since did from their ashes come.

And the eloquent passage concludes with the memorable line which is Shakespeare's all-sufficient eulogy and epitaph:

He was not of an age but for all time!

Do you know of any subsequent appreciation which equals this in its certainty, its splendor and its truth? With a knowledge of this contemporary estimate of the master poet by the master critic of his own time can we go on ignorantly declaring that the greatness of Shakespeare was questionable in his own age and that he has only come into his own with the growth of modern taste and discernment? Can we continue to believe that, forgotten by his own people, he was only discovered by some German professor or other a century or so ago by reason of German kinship with Shakespeare's genius?

And now we come upon the tribute to the realism—I should rather call it the faithful reality—of Shakespeare's art.

All the Muses still were in their prime,
When like Apollo he came forth to warm
Our ears, or like a Mercury to charm!
Nature herself was proud of his designs,
And joy'd to wear the dressing of his lines!
Which were so richly spun, and woven so fit,
As, since, she will vouchsafe no other wit.
The merry Greek, tart Aristophanes,
Neat Terence, witty Plautus, now not please;
But antiquated, and deserted lie
As they were not of Nature's family.

Then follow these remarkable words from the critic of classical leanings who had found Shakespeare "wanting in art."

Yet must I not give Nature all: thy art,
My gentle Shakespeare, must enjoy a part.
For though the poet's matter, Nature be,
His art doth give the fashion. And, that he,
Who casts to write a living line, must sweat,

(Such as thine are) and strike the second heat
Upon the Muses' anvil: turn the same,
(And himself with it) that he thinks to frame;
Or for the laurel, he may gain a scorn,
For a good poet's made, as well as born.
And such wert thou. Look how the father's face
Lives in his issue, even so, the race [the personages]
Of Shakespeare's mind, and manners brightly shines
In his well torned, and true-filled lines:
In each of which, he seems to shake a lance,
As brandish't at the eyes of ignorance.

Were my discourse of the fronds and tendrils of the jungle of criticism with which we began, how many are the books—some of them very recent—which have sprung out of this discerning recognition of Shakespeare as a metrist, a dramatist, a poet, a man of art, consummate and unmatchable? And the poem concludes with this burst of eloquence in which I doubt not that you will discern sundry familiar quotations:

Sweet swan of Avon! what a sight it were
To see thee in our waters yet appear,
And make those flights upon the banks of Thames,
That so did take Eliza, and our James!
But stay, I see thee in the hemisphere
Advanc'd, and made a constellation there!
Shine forth, thou star of poets, and with rage,
Or influence, chide, or cheer the drooping stage;
Which, since thy flight from hence, hath mourn'd like night,
And despairs day, but for thy volume's light.

But, you may ask, was there, then, no other comment and criticism of Shakespeare in his day? Yes, a plenty of comment, applause, appreciation, as that interesting work *The Shakespeare Allusion Book* abundantly discloses—but not criticism, unless we may so designate adjectives like "melliflous," "honey tongued" or an occasional statement that he was possessed of a "facetious grace in writing" or was "excellent in the quality he possessed," (that is acting) and "in both kinds of drama for the stage." There is one exception to this general dearth, the exhorting bookseller's preface to *Troilus and Cressida* which extolls the "brain that never

undertook anything comical vainly" and in which this remarkable prophecy is hazarded, the poet being yet alive: "Believe this, that when he is gone, and his comedies are out of sale, you will scramble for them and set up a new English inquisition," which I take it to mean signifies a house to house search for these valuable contemporary quartos: assuredly here is the very spirit of divination.

Here, for what I have set forth, is then my claim for Jonson as the pod containing the seeds out of which practically all that has proved truly fruitful in our aesthetic criticism and estimate of Shakespeare has actually grown. Jonson is England's first judicial critic. The bulk of his running comment on his time has been, as we have seen, unhappily lost, although we hear again and again echoes of a *bon mot*, an anecdote and have even the delightful code of laws of Jonson's own making in Latin and English which governed those glorious *noctes ambrosianae* in Apollo's room, as earlier at the Mermaid. Of Jonson's literary creed much exists in print, theory and practice alike, in his works. As to his opinions about Shakespeare, we have but little, but what we have is precious and unmistakable, much of it, in its characteristic mixture of learning which reined Jonson in and the honest appreciation of a warm heart which spurred him on. It was the latter which achieved the victory, affirmed by the critic's good sense in his mature verdict, the splendid poem which we have just discussed and which Jonson carefully signed. Importance is to be attached to Jonson's opinions, be it repeated, because he was the critical dictator of his age with scarcely a voice to dissent; and because, above all, Jonson was a competent witness of his time from his intelligence, his honesty and his unparalleled opportunities. Still again an especial value inheres in Jonson's criticism of Shakespeare because so much in Jonson was antithetical to Shakespeare's romantic temper and to the magnificent spendthrift lavishness of his art.

Lastly, what is the Shakespeare that Jonson discloses to us? A ready writer, a lover, a happy portrayer and knower of nature in a large sense of that abused word, which I beseech you

to believe must contain human nature as well as horticulture, an artist, in the processes of his technique, a dramatist and poet unparalleled in his own age and country and even among Ben Jonson's own best beloved ancients; a great writer appreciated absolutely and to the full and for his best by his own age; one whose plays have had their triumphant trial and stand above all like achievement "by all men's suffrage." And finally a man to whom preeminently attached the adjective "gentle" which, in the old tongue, be it remembered, signified one endowed with the sum total of those qualities of mind and heart which constitute the veritable gentleman.

Dear friends, why not take this honest old critic's advice as to our master poet and "read him, therefore, and again and again?" And if you are appalled by the critics and the contradictory things that they persist in telling us, why not seek refuge in the simplicity, the good sense and the sound opinion of rare Ben Jonson?

SOME FINANCIAL PROBLEMS OF WORLD RECONSTRUCTION*

By Thomas Conway, Jr.

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Fourteen months have passed since the signing of the armistice brought to an end the most costly war in the history of the world. While the armistice marked the end of actual fighting, yet the expenses of the war have since continued on a diminishing ratio. We have reached the point, however, where it is possible to make a general estimate of the cost of the war and to outline the financial problems which it has left as a legacy. The cost of the struggle is so great that it almost passes comprehension. Professor Bogart, in his monograph "Direct and Indirect Costs of the Great World war," (prepared for the Carnegie Endowment for International Peace) estimates the expenditures of the belligerent governments, exclusive of duplications resulting from advances by one belligerent to another, to have been $186,334,000,000, while another eminent commentator reaches the conclusion that the total governmental war expenditures, excluding duplications resulting from loans from one belligerent to another aggregated $210,935,000,000.

We have become so used to speaking of billions of dollars in connection with war financing that it is difficult to measure the immensity of this great sum. It is over nine times the aggregate of the stocks, bonds and other corporate obligations of the railroads of the United States, and is much greater than the total investment of the entire world in railroads and public utilities.

From a financial point of view, the direct cost of the war has yet to be paid by the people of the belligerent nations. Less than $15,000,000,000 of the cost of the war was derived from taxation, practically this entire amount being raised by Great

* Delivered January 17, 1920.

Britain and the United States. While Italy and Germany nominally raised several billions of dollars from taxation as contributions to the expenditures of the war, yet the budget deficits in these countries, as well as in France, more than offset the sums so raised. With the exception of the $15,000,000,000 raised from taxation in Great Britian and the United States, the war was conducted almost entirely on credit, and the important and pressing problem confronting every country is how to secure the funds necessary to meet interest payments and to provide for the amortization of the gigantic debts which have been incurred.

Thus far, we have not taken account of the indirect costs of the war, such as the destruction of property; loss of production; interruption to trade, and other similar items: nor of the economic consequences of the great loss of human life and of caring for and supporting the maimed, and the dependents of soldiers killed or incapacitated, which will burden every belligerent nation for at least a generation. The aggregate of such indirect costs is difficult to estimate.

Thirteen million men lost their lives in the conflict, while more than twenty million were wounded. Of the wounded, it has been estimated by competent authorities that over fifty-five per cent. are either totally disabled or have suffered an impairment of faculties which will materially reduce their productive power. Upon this basis, it would appear that the belligerents, in addition to a total loss of thirteen million men, have over eleven million maimed and crippled men, most of whom will be a constant drain upon the revenues of their governments, and whose misfortune will materially reduce the productive power of these countries.

It is even more difficult to form an accurate estimate of the property losses resulting from the war. We all know that war propaganda greatly exaggerated the extent of the devastation in certain regions, but on the other hand, our knowledge is imperfect concerning the destruction of property in the Near East and in certain other sections visited by the great scourge. The best estimates which have thus far been made of the extent

of property losses place them in the neighborhood of $30,000,000,000, not including the loss of shipping, aggregating some $7,000,000,000.

In order to ascertain the total cost of the struggle, there should be added to the above items the expenditures for war relief, aggregating approximately $1,000,000,000; the known losses to neutrals, aggregating approximately one and three-quarter billions, and the loss of production suffered by the belligerent nations during the war period, which has been estimated to equal forty-five billion dollars, on the basis of an average productive capacity of $500 per man for those included in the armed forces of the several nations. If these sums be added to the total known direct costs of the war, it will be seen that the gigantic struggle has cost the world over $330,000,000,000. A portion of this enormous total represents losses which can never be made good and which, therefore, do not have to be provided for in the financial plans of the world for the coming years, but the war debts incurred by the belligerents, the loss of shipping and the destruction of private property must be made good, and they aggregate over $230,000,000,000,—a sum approximately equal to the estimated total wealth of the people of the United States.

Largely because of the fact that over ninety per cent. of the direct cost of the war to the belligerent governments was financed on credit, there has followed a tremendous inflation of prices. Wholesale prices in the United States have increased since July 1914, approximately 123 per cent. while the cost of living, as determined by various investigations, has increased approximately 75 to 90 per cent. (dependent upon the sections of the country) during this period. The incerease in prices in other countries has been substantially similar. Wholesale prices in England have increased some 158 per cent. since the summer 1914, while prices on the Continent have increased as much or more. The cost of living of the average family of England, France and Germany has, in general, kept pace with the advance in prices. Bank deposits in every country have been very

largely expanded as the result of war borrowing. Of all of the belligerent nations, the United States alone is on a gold basis. The enormous issues of paper money—now actually inconvertible—which have been put out in England, France and Germany have aggravated the financial and industrial situation and constitute a most serious problem in connection with the necessary financial readjustment.

The war has completely revolutionized the trade relations of the European nations with the rest of the world. A few illustrations will suffice to show what has happened. In 1913, prior to the outbreak of the war, Great Britain imported £769,000,000 of merchandise and exported £635,000,000, or an excess of imports over exports of £134,000,000. Great Britain, like most of the continental countries, had, for many years prior to the war, imported more than she exported, being in the fortunate position of a creditor nation to whom payments on account of interest on investments in foreign countries were due, which payments were made in large measure indirectly in the form of merchandise. For the first ten months of 1919, Great Britian's imports aggregated £1,319,000,000, while her exports mounted to £738,000,000;—an excess of imports over exports of £581,000,000, or at the rate of approximately £700,000,000 per annum. A closer analysis of the results for the first ten months of 1919, compared with the business of the year 1913, taking into account the changes in price levels which have occurred in the interval, discloses the fact that if the 1913 imports had been figured at 1919 prices, they would have slightly exceeded in value the total imports of Great Britian in the year 1919. The difficulty is primarily that Great Britian's exports have greatly declined. Her 1913 exports at present prices would be worth approximately £1,428,000,000, or about 60% in excess of the exports in the year 1919.

The unfavorable shift in the foreign trade situation of France and Italy is even worse, while the Central Powers, cut off for four years by the blockade from the rest of the world, are under the necessity of entirely rebuilding their foreign trade.

It is now very clear that without the United States, the Allies would have been signally defeated. Not only was the military help of this country extended at the critical hour of the conflict but the aid which was furnished to the Allies—almost from the beginning of the war—in the form of food, clothing and munitions of every character, was indispensable in enabling them to continue the struggle.

The change in the foreign trade situation of the United States in the last five years has been most startling. At the outbreak of the war, the United States was a debtor country, that is to say, she owed to the people of Europe large sums of money each year on account of investments made by them in the United States; because of the expenditures of American tourists abroad, and on account of ocean freight charges and insurance paid to foreign countries, incident to the foreign trade of this country. The aggregate of these items was approximately $600,000,000 per year. It followed, therefore, that in order to square accounts, it was necessary for this country, one year with another, to export $600,000,000 in value more than was imported.

With the outbreak of the European War, our foreign trade relations underwent a great change. Measured in dollars, our imports showed a very large growth, although if allowance is made for the decreasing purchasing power of money, they are little greater at the present time than they were in 1914. On the other hand, our exports of merchandise grew enormously, expanding from a total of $2,113,624,050 in 1914 to $6,149,132,647 in 1918. During the first ten months of 1919, our imports were $3,098,846,922 and our exports $6,501,557,587, producing an excess of exports over imports of $3,402,710,665, or at the rate of over $4,000,000,000 per annum. The aggregate excess of exports over imports from January 1, 1914, to October 31, 1919, was $14,993,271,200 A good part of this total is the result of the loans made by the United States Government to the Allies, aggregating over $9,676,000,000.

The economic causes of the tremendous excess of exports over imports have been so frequently explained that I feel they

are familiar to everyone present. In brief, the great expansion in our exports represents the material contributions of food supplies and munitions made by this country almost from the beginning of the struggle in 1914, which made it possible for the Allies to continue the war until America's forces turned the tide to victory.

We are not primarily concerned with the reasons for the growth of this export trade but with the future problems which it has created. The United States, in five years, has passed from the position of a debtor nation to one of the great creditor nations of the world. The consequences which this entails are most important and will exert a vital influence upon the history of this country for many years. A debtor nation—that is, one owing sums of money to foreign countries on account of interest upon loans extended to it or investments made within its borders by foreign citizens—is under the necessity of exporting more than it imports, in order to pay the interest upon such loans or investments, except where the creditor countries are willing to make new investments aggregating in amount a sum at least equal to their annual interest on existing investments or loans. The debtor countries of pre-war days, such as the United States, the Australasian colonies of Great Britain, Brazil or Argentine, therefore had a so-called favorable balance of merchandise trade or excess of exports over imports. The predominant characteristics of the trade of creditor nations, on the other hand, is an excess in value of imports over exports, particularly when the creditor country is not reinvesting abroad its annual interest returns upon foreign investments. To illustrate my point, the Allies now owe the United States government almost $10,000,000,000, on which the annual interest payments aggregate about $475,000,000 per annum. As the Secretary of the Treasury, in his letter to the Chairman of the Committee on Ways and Means, well said, in proposing a postponement of interest payments for several years upon this debt:

"A nation can liquidate its foreign debts only by the

accumulation of foreign credits, which may be accomplished through an excess trade balance, invisible exchange items, the creation of credits by loans, or by the export of gold. Until our associates in the war, whose manufactures and trade suffered so much more than ours, have had opportunity to resume normal industrial and commercial activities, they have not the exports with which to pay the interest due on our obligations and could make such payments only by the shipment of gold or by obtaining dollar loans in the United States.

"The loans which the allied Governments have been so far able to place in our markets have not been sufficient to correct the situation. I cannot believe that anyone would consider it equitable or wise in the present circumstances for us to require payment in gold, of which we already have enough, when the payment of one year's interest alone would exhaust about 50% of the gold reserve of our debtors.

"While I fully realize the desirability of collecting this interest and of decreasing at once by a corresponding amount the taxes which we must collect, I should be most reluctant without specific instructions from Congress to demand the immediate payment of interest which would not only seriously retard the economic restoration of those countries, without which they will be unable to pay the interest and principal of their debt to us, but which would also destroy their power to make needed purchases in our market."

Since the discontinuance of advances by the United States Government to the Allies, the foreign exchange situation has been badly demoralized. Foreign exchange is an ingenious device for the settlement of debts between people of different countries without the shipment of gold or silver, constituting the money of international finance. Through the foreign exchange market, it is possible to offset the debits and credits arising out of imports and exports. The bill of exchange accomplishes the same purpose in international trade that the ordinary bank check performs in the payment of debts in domestic business.

European exchange is now and for many months has been selling at unheard-of discounts. Sterling exchange has of late fluctuated from $3.74 to $3.80 (cable transfers) which means that for $3.80 one can buy a British pound sterling, normally worth $4.86. Sterling is therefore at a discount of 22%. On the same basis, francs (the exchange of France) are now selling at a discount of 54%; Italian lire at a discount of 62%, and German marks at a discount of 91%. The eventual effect of such conditions, if continued, upon the foreign trade of the United States, will be most profound. Present exchange rates mean in substance that articles purchased by French importers in the United States and shipped to France for sale, cost approximately twice their price in the American market, exclusive of freight and insurance charges. In view of the very high prices prevailing in this country, this situation makes the purchase of large quantities of merchandise in the United States for sale abroad very expensive, and if not corrected, would in time discourage all exports, except where foreign necessities compel the procurement of the supplies.

On the other hand, the present exchanges make this country a most inviting field for the foreign manufacturer or the American importer. An importer in New York can buy an article which, under normal exchange conditions, we may say would be worth $1.00 in France, and because of the large discount on French exchange, can buy a bill of exchange in payment of his debt for 46¢ on the dollar, so that, excluding freight, insurance and interest while in transit, his French merchandise would cost him 46¢.

The extraordinary condition of foreign exchanges is the consequence of the abnormal trade relations of the nations of the world. International financing, through the floating of loans and the establishment of credits from the proceeds thereof, upon which the nation having the unfavorable trade balance may draw for the payment of its debts, will tend to bridge the situation, but in the last analysis, the correctives of abnormal exchange situations are to be found through the operation of well-known economic forces. There is nothing mysterious

about the workings of international exchange. In the long run, goods bought in a foreign country can be settled for only by the sale of other goods or services, by the shipment of gold, constituting the international medium of exchange, or through the continued sale of sufficient securities in the markets of the creditor nation to provide a fund equal to the adverse trade balance.

Unless the American people are prepared to make investments aggregating billions of dollars per annum in European countries, which seems very unlikely, we must prepare for a more or less rapid change in our foreign trade situation. The excess of exports over imports during recent years has been entirely too large to represent a permanent phenomenon and can only be maintained, as I have said, by enormous annual investments of American funds in European countries. Bankers report that the American public is cool with respect to the purchase of foreign securities. From an investment point of view, the average American is still insular in his point of view. He doubts the wisdom of foreign investments and is distrustful of the security of his money when so invested, especially in these troublous times. Moreover, the capital requirements of this country during the next few years for the extension of our railroad facilities and other purposes are so large that investors will find attractive opportunities for the employment of their funds within this country. We must look forward, I believe, to an eventual shrinkage in our exports and an increase in our imports, and this change, assuming that it can be made gradually, will be of great advantage to this country. Both a decrease in our exports and an increase in our imports will tend to increase the supply of goods in this country, thereby ending the famine of merchandise which has been responsible in considerable part, for the high cost of living. An increase in the supply of merchandise of all classes should tend to bring about a recession of prices and tend to improve materially the labor situation and reduce the cost of living. A too rapid readjustment of our forign trade would be dangerous for American business because it would produce a glut of

merchandise in this market through the sudden stoppage of our exports, with resultant unemployment and hard times. With skilful management of our industrial and financial institutions, it should be possible to escape this unfortunate alternative.

The problem of the moment is to provide facilities for the extension of long time credits in sufficient volume to enable Europe to finance such purchases as, from the point of view of the best interests of the entire world, she should be assisted in making. By this I mean that it is not to America's interest, nor to the interest of Europe to provide credits for the purchase of luxuries or, indeed, for any other purpose than to assist the European nations to reach a self-sustaining basis. Various agencies are at hand for this purpose. Congress has authorized War Finance Corporation to employ its resources under certain conditions for such purposes, and the Managing Director of this corporation has announced that some $900,000,000 is available for such uses. Congress has recently passed the so-called Edge law, authorizing the creation of special banking corporations for the purpose of extending long time credits in aid of foreign trade. The Government has wisely decided that there is no necessity for the Government to extend further credits. The problem is essentially one of investment banking and should be handled through ordinary business channels, with such assistance as can be properly rendered by War Finance Corporation and other government agencies.

The American people have been rendered uneasy concerning the extent of their moral responsibilities by foreign propaganda designed to bring about the contribution of millions of dollars of supplies to feed starving Europe and to save it from Bolshevism and anarchy, and for the wholesale extension of credit for the restoration of European industries. I think we will all agree that Mr. Herbert Hoover has had a better opportunity to acquaint himself with the needs of Europe and its present situation than anyone in America. Mr. Hoover, in a prepared statement issued January 7th, declared:

"I disagree emphatically with the statement being circulated

by European propagandists both as to the volume of European financial needs from the United States and as to their suggestions that the great bulk of these needs cannot be met by ordinary commercial credits and that therefore our Treasury needs to be further drawn upon for new loans.

"Aside from some secondary measures by our Government the problem is one of ratification of peace and ordinary business processes, and not one of increasing our burden of taxation. Our taxes are now 600 per cent, over pre-war rates. We simply cannot increase this burden. Rather the problem is one of early reduction.

"By secondary measures I mean that some dozen cities in central and southern Europe need breadstuffs on credit from the grain corporation to prevent actual starvation, and that the Allies are asking for temporary delay in paying interest on our Government loans to them. The Allies cannot pay this year in any event.

"Outside of interest to the Allies, Great Britain states that they want nothing but commercial credits. These she can always obtain if she puts up her ample collateral assets in South America, China, etc. France also has unpledged foreign assets that would cover most of her important needs.

"The American people are now finding $7,000,000 a month in charity for feeding 3,000,000 children and fighting disease. If we contribute bread supply on Government credit to these starving cities plus business credits, we will be doing our share of world responsibility.

"Our Government has a large surplus of wheat flour acquired by it under the wheat guarantee. In the ordinary course we should hold it for cash from foreign nations. We could solve the bread situation in the dozen critical centres in Europe if the grain corporation were to sell about 15 per cent of our surplus wheat and flour on credit to meet these acute situations. The difference between these credits and cash is the difference between starvation and existence to them. These plans require no new appropriations from our treasury and no additional taxes on our people, but they do require an

understanding in Europe that this country is nearing the time when it must cease to carry the economic burden of Europe except through charity and ordinary business processes set up under proper security.

"The position of Italy is difficult; but with demobilization of her army and her navy her needs would be less. So far as I know, no one is threatening her with war. It is possible that some of her larger cities may need bread-stuff assistance beyond the ability of commercial credits. Germany could pay or secure commercial credits if the reparation commission would allow her to mobilize and use her domestic resources and her unpledged foreign assets until she gets further on her feet. The East Baltic States have enough food except milk for their children, and we are taking care of this.

"Bulgaria, Greater Serbia, Rumania, South Russia, and Turkey (except Armenia) have a surplus of food this year and can export it. If they control the import of silk stockings, perfume, and other non-essentials, they can procure their other imports or at least live until they do it on a business basis. Hungary could feed herself if Rumania would return the cattle and grain she abstracted last summer.

"We are, therefore, left with Finland, Belgium, Poland, Czechoslovakia, and Austria to consider. Austria is the sorest point in Europe and while she must be fed this Winter the Allies should be made to realize that any assistance from us is upon condition that she is free to make such political associations as will take her out of a perpetual poorhouse.

"Most European statesmen naturally desire to please their people by borrowing from our Government to revive prosperity over night, but to my mind the one essential thing for all these countries which cannot provide for themselves out of normal commerce is to feed their people over this Winter and defer immediate rehabilitation of their specialized industry until the world recovers sufficiently for them to secure commercial credits and private capital.

"In the food matter the last five countries mentioned will

take care of their agricultural and small town populations out of their crops of last year, leaving the crowded centres to be provided for, and these dozen or so large cities, including Italy's deficiency, affect populations aggregating fifteen or twenty million people. Even these have some resources that, to my mind, are sufficient to take care of their food needs, except bread, together with milk for the children, and the most of the latter if being provided for by charity.

"Therefore the problem from the point of view of action of our Government, outside the temporary deferring of interest, is reduced to helping out the bread supply of less than 5 per cent. of the population of Europe. This is only an echo of the job that our Government had to undertake in the year ending August first last in saving Europe from famine. Therefore no such situation exists as that which confronted us last year at this time and there is no ground for hysteria on either side of the Atlantic.

"While restoration of last year's complete control of supplies in Europe might make things go smoother temporarily, it stifles initiative and does more damage than good.

"We withdrew from Europe at last harvest precisely for this reason; that Europe had to be impressed with the necessity to get back to work and ordinary business processes. The world needs to get away from the notion of governmental help, both internally and externally, and get back to work and to business."

In line with Mr. Hoover's appraisal of the situation, the Secretary of the Treasury has asked Congress for permission to employ $150,000,000 of the funds of the United States Grain Corporation in furnishing supplies to ten or twelve of the large cities of Austria, Poland and Armenia, the money to be loaned to these countries, repayable within a period of years.

Having disposed of the question as to the extent of the obligations of America with respect to furnishing food supplies, let us examine the viewpoint of Europe concerning the purchase, in this market, of large quantities of machinery, raw materials and manufactured goods of various kinds.

A perusal of the European trade and financial papers discloses the fact that Europe's thoughts are centered upon a reduction of her imports and an expansion of her exports rather than continued large purchases from the United States and other countries. European bankers, business men and economists realize that Europe cannot go on indefinitely borrowing from the United States and other countries, and that it is imperative that an industrial equilibrium be established at the earliest practicable moment. While the end to be achieved is very clear in the minds of well-informed Europeans, yet the situation confronting them and from which they must work towards the desired result is almost inconceivably bad, and therefore a period of months or perhaps several years may be required to bring about the transition.

I believe Mr. Vanderlip correctly analyzed the situation when he stated, in his very interesting book "What Happened to Europe?" that

> "The most profoundly significant thing that I sensed in Europe is the disorganization and paralysis of industrial production. The paralysis is not confined to the war zone. It extends to the industries of the neutral countries. So long as it continues, there is danger of revolutionary development of Bolshevik tendencies. Wherever unrest develops into Bolshevism, that new name for an old disease, anarchy, there is danger of contagion, and the disease is liable to spread to adjacent territory. This makes it necessary to regard Europe as a unit in any forecast of future conditions, for no Government is strongly enough fortified against the inroads of this microbe of social contagion to permit its future to be regarded as safe when its neighbors develop this type of revolution."

It is true that Europe is in need of a large amount of raw materials necessary for the re-establishment of her industries and that if an advantageous financial arrangement can be made, she will purchase large amounts of machinery and industrial equipment for her railroads and factories, in order to hasten the rehabilitation and re-establishment of her industrial plants.

One of the members of the French Commission sent to the recent International Trade Conference at Washington declared that France will have to spend three billion francs, or—

excluding from consideration the present exchange rate—approximately $600,000,000 in the United States during the coming year for the purchase of cotton, wheat, oats, coal and machinery, which sum represents approximately 65% of our exports to France in the year 1919. While authoritative estimates are lacking concerning the probable extent of the demands of other European nations, it seems probable that the potential demand for American goods will aggregate several billion dollars.

The character of Europe's demands must be clearly understood to appreciate the limitations of our foreign market. In general, Europe must depend upon us and other foreign countries for a considerable part of her food supply. She must look to us for supplies of cotton, copper and other raw materials of which she is in need as the basis of her manufacturing industries. She will require locomotives, cars and machinery of various kinds in order more quickly to rehabilitate and reestablish her industrial enterprises, but she will not welcome an influx of American goods falling within the so-called "luxury class," nor will she look with favor upon American enterprises seeking to rebuild the devastated sections or to enlarge existing plants and facilities.

Several weeks ago, some twenty important American steel, iron and machinery firms offered, through the American Chamber of Commerce in Paris, a plan for the reconstruction of the devastated regions of northern France. The American firms in question offered to provide the capital required, on the security of the amount that France expects sooner or later to receive from Germany in the form of reparations. A condition of the proposal was that the firms providing the capital should be given the contracts for the carrying out of the work. As a means of organizing the project, it was proposed to create a board of twenty-four members, two-thirds of whom should be representative Mayors of the towns and cities affected, the balance being representatives of the American firms concerned. This proposal met with practically no support, and fell to the ground largely because of the widespread objections prevailing

in the northern district of France against any plan of reconstruction to be carried out by foreign agencies. The French made it clear that they were determined to handle the work of reconstruction themselves. Nor can anyone blame France for this attitude when it is understood that French purchases from England have increased 470% from 1913 to 1918, while French sales to England have diminsihed by 26%. In 1913, the excess of French imports from the United States over exports to this country was 111%. In 1917, the excess of imports over exports had increased to 1335%. The difficulties which France will have to meet in purchasing raw materials will be sufficiently great to induce her to perform as much of the work of reconstruction as is possible with her own labor and material resources. The purchasing branch of the Ministry of Industrial Reconstruction of France has placed large orders in Germany for knitting machines and other implements and for manufactured goods, and is preparing to give other extensive orders to German firms. The French have learned the lesson, which many people in this country have not yet learned, that the inflamed hatreds, engendered by propaganda and the passions of war, must be laid aside, and that it is to the advantage of France to buy as much as possible from her former foe. In this way only will Germany be able to meet her war indemnity and to carry out her obligation to finance, in so far as possible, the rehabilitation of the devastated regions. The French Minister of Commerce has urged that everything possible be purchased from Germany rather than from the Allied Countries for the reason already given and because of the further fact that whereas exchange is very unfavorable to France in trading with the Allies, it is in her favor in importing merchandise from Germany.

England's view of her trade problem was epitomized by the Chancellor of the Exchequer in an address delivered some weeks ago at Lloyds:

"We have lived upon a world wide trade; none know it better than you. That world-wide trade is more important to us now than at any period in our history; it is only by its resump-

tion, nay, more, by its expansion that we can meet the gigantic burdens which this awful struggle has left us to bear. But as long as inflation of prices continues and increases, our foreign trade will be crippled."

I think the whole problem now facing Europe was summarized in a few sentences by Premier Lloyd George in a recent address before the House of Commons. In extracting his remarks, I have taken the liberty of converting the figures used by him from pounds sterling to dollars, in order that you can more readily follow the situation which he outlines:

"Our adverse balance before the war was $750,000,000; our adverse balance at the present date is nearly $4,000,000,000.

"How did you reach that $750,000,000 before the war? We had invisible exports of $1,750,000,000, a balance on that account of $1,000,000,000 in our favor. What happened to that? We reinvested it nearly every year, with the result that the indebtedness of the world to us was increasing rapidly every year, more especially for the last seven or eight years before the war.

"What has happened since the war? We have sold $5,000,000,000 of our foreign securities to pay for war material. We borrowed probably another $6,000,000,000 from America * * *

"As far as receipts are concerned, from our foreign commitments we are down $5,000,000,000. We have got to pay an adverse balance of $4,000,000,000. We must bridge that chasm, for at the bottom of it is ruin—ruin. We are building a temporary bridge now by borrowing—not by State borrowing but by trade borrowing—by running into debt for raw material and for goods. That will only add to the catastrophe—for you are advancing farther on a bridge which is a shaky one, and you are advancing with increasing weight along it. That is the position in regard to international trade * * *

"To meet this condition of things * * * there is but one resource—that is, increased production. What are the facts? There is almost a sensational decrease in output. That is true of every branch of production except agriculture, where you have had an increase since the war. We are spending more,

we are earning less. We are consuming more, we are producing less. It can not last."

Great Britain's foreign trade situation presents most difficult and complex problems. British India, her largest pre-war customer, has been exporting so much more than she has been buying that she is rapidly absorbing the greater part of the world's silver supply. Germany, England's second largest customer, loaded down with an undetermined burden of debt and hampered at every turn by a punitive peace, will obviously not be in a position to purchase as largely as heretofore. The Australian business, which prior to 1914 ranked third in importance, has been much reduced by the scarcity of shipping, which, together with the demands of the war, greatly changed the economic life of this region. France, formerly the fourth largest customer, is bending every effort, as we have seen, to decrease imports and increase exports. And so the list might be extended. Trade relations must be re-established. England's largest group of customers—the continent of Europe—is in need of large quantities of goods but does not possess the means of paying for them. It seems certain that England must devise a method of extending long time credits to her former European customers if she is to re-create her European trade.

Germany's position in international trade is a matter more generally misunderstood in this country than any phase of the European situation. The bogie of German competition furnishes an ever-ready topic for propagandists. English business interests, at least, have no hallucinations about the danger of German competition. The London Economist, the leading commercial and financial publication of England, summarized the German situation in a recent issue as follows:

"We have not heard much of German "dumping" since the terrified toy-makers rushed off to the Board of Trade and returned thence very cold and wet. The fantastic theory that a country stripped of raw materials—most of which it is obliged to buy from outside—could instantly flood the world with cheap goods, has gone for the moment the way of

many other theories equally valuable. That Germany will recover we have no doubt; that it is urgently in the interest of Europe that Germany should recover is also beyond doubt. But the road will be long and stony, and even the industrious and soul-chastened Germans will have very sore feet before the end is reached. In the meantime all information concerning Germany's efforts to rebuild her industries, and all indications of how she is setting about the colossal job, should be of great interest to the British people. Not only is the economic health of Europe largely dependent upon that of Germany, the most highly developed country on the Continent, but Germany is in debt to the Allies for vast indefinite sums. Not even the stupidest of creditors tries nowadays to prevent his debtor from working and paying his debts.

"It says much for the energy of our late enemies that at the Leipzig Fair, held last month, there should have been nearly 10,000 German exhibitors. Few foreign firms were represented except as buyers, British firms scarcely at all. The German firms put up the best show possible, but their factories have been on short time owing to lack of coal, and the low exchange value of the mark has made purchases of foreign raw material almost prohibitive in price. It was apparent to observers at the Fair that German industry is tied in shackles, and that effective competition in most branches of the export trade is beyond their present ambitions. They are trying to get a foothold in American and neutral markets by specialising in mechanical inventions for the manufacture of which material exists in the country. For export to these countries their low exchange helps them so long as they have not to buy from outside any considerable part of the material which enters into the goods. Thus in their mechanical and electrical devices, they use iron and steel wherever they possible can, and avoid brass and aluminum. Adversity has quickened the German wits, for the Fair was notable for the number of ingenious contrivances shown in it, and the eagerness of their exhibitors to sell the patents to foreign manufacturers. The Germans are anxious to coin their

war-stimulated brains into credit abroad, and so to reestablish that flow of foreign material—copper and aluminum, rubber and cotton, and wool—without which an industrial organism is tied hand and foot.

"The main facts of Germany's position are simple. By the terms of the Peace Treaty the supplies of coal available to Germans have been reduced to nearly two-thirds. Even before the war Germany imported largely from the British East Coast coal ports, so that, with the present reduced supplies, nothing like a rapid industrial recovery is possible. As with coal, so with iron ore. Lorraine has been taken away altogether, the Saar Valley for 15 years. This means that Germany's output of iron ore, which before the war was about 27 million tons per annum, is not expected at present to exceed seven million tons. And since it takes four and a-half tons of coal to make a ton of steel Germany's shortage of coal must for a long time place her in the low ranks of steel producers. Wood she has in plenty, and wool production she can develop; but supplies of cotton must be obtained from outside, and flax, though it can be grown well on the shores of the Baltic, can scarcely be widely cultivated except at the cost of some other important crop. Germany will be driven by her low exchange to develop to the utmost her internal resources, but the war, which has loaded her with debt, has also stripped her of much valuable territory. For British manufacturers to be in terror of Germans seems to us, under existing conditions, to be the feeblest kind of cowardice.

"For the moment the Germans are producing luxuries more successfully than necessities. Fine machinery is the product of brains and manual skill; material and coal do not bulk largely in its cost. Hence we find at the Leipzig Fair ingenious well-made machinery far more abundant than humble Portland cement—which demands half its weight in coal- and high-class expensive porcelain more plentiful than domestic crockery. Some of those trades in which Germany was pre-eminent before the war are now suffering most severely. Mechanical toys and toys made of native wood are

plentiful, but better class clothed dolls cannot be made for export because cotton, wool, and linen for the clothes are not to be had. The typically German stuffed animal, in which children delighted years ago, is short of stuffing, and when packed somehow is highly costly. A year hence we may see again the cheap German toy commanding our Christmas markets, and by then, when passions have cooled, it will be welcomed in thousands of homes. English toy makers will have to produce much better and cheaper work before they will have a chance of holding the market against the Japanese and a Germany convalescent. The British parent's grumble with the British toy is that it is both dear and bad.

"The paper industry, in some branches of which Germany had a practical monopoly, is now restricted to the lower grades, and even in them the total output for the home and export trade has fallen by two-thirds. The better class rag and esparto paper cannot be made at all—material and coal are both lacking. Some of the factories are closed down, the others are working the shortest of time. The same story is told of textiles. No serious work can be done without cotton, wool, and flax. Gaudy displays of shoddy and "paper textiles" (made from wood pulp) may be heroic, but they do not imply business in the world's textile markets. If Germany could produce cottons, woolens, and linens of the pre-war quality there would be no need for a year or two to seek after export markets. The Germans, who have shivered for years in substitutes, have an appetite for the real thing which is ravenous. They cannot be supplied at home, and they cannot buy abroad with the mark at less than twopence halfpenny. For another winter they must put up with paper.

"Expensive jewelry is abundant for the same reason that fine machinery and costly porcelain are abundant. It does not require in the making much of material or coal. It was observed last month at Leipzig that the German with money showed much eagerness to turn his perishable paper marks into a more stable currency. Like the great Mr. Wemmick, the German has developed a passion for portable property, for

goods which are valuable everywhere rather than for depreciated paper which is worth little even in its country of origin.

"The woes of the defeated Germans do not readily excite us to tears. Yet we cannot wholly refrain from sympathy with their struggles against adversity. They are really working very hard and polishing all their wits to win a way out of their disastrous economic plight. Two most formidable barriers—the cost of imported raw material and the shortage of coal-stand between them and the world's export trade. Not able at present to climb these walls or to push them down, they are busily drilling all sorts of little holes through which a thin trickle of trade may flow. For our part we do not grudge them any success which they may achieve. On the contrary, we find it in our hearts to wish our late enemies a happy issue out of all their tribulations. Our sympathy has its roots in self-interest. For until Germany recovers Europe cannot recover, and until Europe recovers Great Britain will lack much which it would wish to buy and seek vainly for markets in which it would wish to sell. Our people are gradually learning the hardest of lessons—that a rich Germany is much better for us than a poor Germany, and that a Germany which buys from or sells to us is conferring not an injury but a benefit."

The query naturally presents itself, "What of the inland countries of Europe?" Austria, in the words of Mr. Hoover, "is consigned to a perpetual poorhouse" by the terms of a bungling and unworkable peace treaty. The Balkan States have been reduced to the lowest ebb, and it will be many years before their affairs will reach a normal basis. The greatest enigma is, of course, Russia, from whom nothing can be expected until a stable and practicable economic regime has been re-established.

In general, the fundamental difficulties of Europe may be summarized as due to several important causes, among which are the lack of raw materials; the disorganization of industry; the universal scarcity of coal, impairing personal comfort and restricting output, and the alarming unwillingness of a large proportion of the population to labor diligently and steadily.

The process of rehabilitation must involve the re-establishment at the earliest practicable date, of an equilibrium between governmental income and expenditures, bringing to an end the piling up of government debt and further emissions of inconvertible paper money, which have contributed so largely to high prices and the unfavorable exchange situation. Thus far, the responsible ministries of Europe have shown a marked disinclination to impose taxes which would yield sufficient revenues to meet current expenditures, including interest upon the outstanding government debt. The plea advanced in some quarters that high taxation at this time will discourage and hamper the revival of industry finds a ready response among a large porportion of the people of Europe. None of the late belligerents has been willing to impose taxation equal to its requirements, in spite of the fact that the foreign economic and financial press is almost a unit in demanding that the governments shall squarely face the issue and shallforth with levy the necessary taxes. All of the European belligerents are seriously considering a method more or less drastic to cut down at once the burden of debt.

Suggestions come from many quarters of a capital levy or property tax for the purpose of reducing, to a considerable extent, the public debt of the European nations. Such a tax is, in reality, but a euphonious name for the confiscation of property by the government. The Italian Minister is considering a forced loan as a means of meeting the financial difficulties of that nation, which, if carried into execution, would mean the re-establishment of a financial expedient common in the Middle Ages. While it is not certain that any such undesirable methods will actually be employed, yet their frequent proposal is symptomatic of the serious situation which exists. The French Finance Minister has stated that it would be necessary to increase revenues fifty per cent. over and above those produced by the taxes of 1919, in order to bring about a financial equilibrium between income and expenditures. Of all of the European nations, Great Britain can most readily raise the necessary taxes.

The necessity for restoring a financial equilibrium between income and expenditures is well stated in the International Memorial, made public on January 15th, simultaneously submitted to the leading nations of the world, and bearing the signatures of some forty-four eminent American financiers and business men:

"There can be no social or economic future for any country which adopts a permanent policy of meeting its current expenditure by a continuous inflation of its circulation and by increasing its interest-bearing debts without a corresponding increase of its tangible assets. In practice every country will have to be treated after careful study and with due regard to its individual conditions and requirements. No country, however, is deserving of credit, nor can it be considered a solvent debtor, whose obligations we may treat as items of actual value in formulating our plans for the future, that will not or can not bring its current expenditure within the compass of its receipts from taxation and other regular income. This principle must be clearly brought home to the peoples of all countries; for it will be impossible otherwise to arouse them from a dream of false hopes and illusions to the recognition of hard facts.

"It is evident that Germany and Austria will have to bear a heavier load than their conquerors, and that, in conformity with the Treaty of Peace, they must bear the largest possible burden they may safely assume. But care will have to be taken that this burden does not exceed the measure of the highest practicable taxation and that it does not destroy the power of production, which forms the very source of effective taxation.

"For the sake of their creditors and for the sake of the world, whose future social and economic development is involved, Germany and Austria must not be rendered bankrupt. If, for instance, upon close examination, the Commission des Reparation finds that, even with the most drastic plan of taxation of property, income, trade and consumption, the sums that these countries will be able to contribute immediately toward the

current expenses of their creditors will not reach the obligations now stipulated, then the commission might be expected to take the view that the scope of the annual contribution must be brought within the limits within which solvency can be preserved, even though it might be necessary for that purpose to extend the period of instalments.

"The load of the burden and the period during which it is to be borne must not, however, exceed certain bounds. It must not bring about so drastic a lowering of the standard of living that a willingness to pay a just debt is converted into a spirit of despair and revolt.

"It is also true that among the victorious countries there are some whose economic condition is exceedingly grave and which will have to reach the limits of their taxing powers. It appears therefore, to the undersigned, that the position of these countries, too, should be examined from the same point of view of keeping taxation within the power of endurance, and within a scope that will not be conducive to financial chaos and social unrest."

Continuing the Memorial suggests the following principles which should govern the world in meeting the present serious financial situation:

"1. The greater part of the funds must necessarily be supplied by those countries where the trade balance and the exchanges are favorable.

"2. Long-term foreign credit, such as is here contemplated, is only desirable in so far as it is absolutely necessary to restore productive processes. It is not a substitute for those efforts and sacrifices on the part of each country by which alone they can solve their internal problem. It is only by the real economic conditions pressing severely, as they must, on the individual that equilibrium can be restored.

"3. For this reason, and also because of the great demands on capital for their own internal purposes in the lending countries themselves, the credit supplied should be reduced to the minimum absolutely necessary.

"4. Assistance should, as far as possible, be given in a

form which leaves national and international trade free from restrictive control of governments.

"5. Any scheme should encourage to the greatest extent possible the supply of credit and the development of trade through normal channels.

"In so far as it proves possible to issue loans to the public in the lending countries, these loans must be on such terms as will attract the real savings of the individual: otherwise inflation would be increased.

"7. The borrowing countries would have to provide the best obtainable security. For this purpose it should be agreed that:

"(*a*) Such loans should rank in front of all other indebtedness whatsoever, whether internal debt, reparation payment, or inter-allied governmental debt.

"(*b*) Special security should be set aside by the borrowing countries as a guarantee for the payment of interest and amortization, the character of such security varying perhaps from country to country, but including in the case of Germany and the new states the assignment of import and export duties payable on a gold basis, and in the case of states entitled to receipts from Germany, a first charge on such receipts."

One of the most alarming features of the situation is the widely prevalent disinclination to work, existing not only in this country but throughout the entire world. The war has produced a spirit of restlessness and has destroyed habits of industry and thrift created by years of peace.

The uncertain element in the entire situation concerns the willingness of the people of Europe to throw aside the specious and unsound panaceas of the ultra-radicals, to turn their backs upon the mirage of Bolshevism and Sovietism, and in the same spirit of united determination and self-discipline with which they waged the war, start back over the long, hard trail to comfort and prosperity. The ultimate hope for a speedy return to normal conditions depends upon the fiber of the people of Europe and America, their common-sense and

good judgment in realizing that of all times in the history of the world, this is not the time in which to try visionary economic experiments and Utopian theories. As Mr. Asquith, former British Premier, in a speech delivered recently before the Free Trade Union, well said:

"What is the real remedy against high prices and of the individual hardships which the war has brought? First and foremost, public economy * * * The next thing is increased and better production * * * The prime economic need at this moment of mankind is that production should be increased until the maximum output is obtained. What is true at home in the domestic sphere is not only equally true but more significantly true in the international sphere."

The hope of the world depends upon the willingness of the people of Europe and of America to produce more and save more, and thus gradually absorb the outstanding war obligations and make good the ravages of the great conflict. I believe it is the duty of every one of us, upon every occasion, to preach the gospel that the cure for the economic ills which beset us on every side, is to work and save,—faithful, industrious work, thrift, and the wise investment of our savings against the proverbial rainy day.

PROGRESS

By Edgar A. Singer, Jr.,

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We little realize, until we have met them socially, how engaging the manners of cannibals can be. It is unfortunate that so many obstacles lie in the way of our making their better acquaintance,—they live so far out of town for one thing, and for another are so clannish a set that only occasionally is one of our sort welcomed to their inner circles. Yet when one who has had this fortune returns to tell about it,—which happens too rarely—we can see it has been a revelation to him and an enlightenment. There is that friend of our youth, Herman Melville, who about the year 1840 was entertained by the Merquesan Islanders—I swear that as I read him I find something very winning about the ways of these people. It is true they were what Melville calls "occasional cannibals;" but although cannibalism, however occasional, cannot win our entire approval (perhaps because, as Montaigne suggests, we have learned how much better it is to torment our enemies alive than to consume them dead) yet it is not wise or just to allow our prejudice against an odd local custom to blind us to so much that is fair in their lives.

For much there is that is fair in the lives of the Typees. Dwelling on that enchanted island of the Pacific, their lines are cast in pleasant places. The asperities which civilization seems rather to have aggravated than softened do not roughen their way. Their existence is passed in the midst of tropical plenty, on which their numbers, few and not on the increase, make light demand. They toil not to cover what nature has conceived in innocence, and spin but lightly to adorn what nature has fashioned fair. Little thought do they take on their housing. "There are few villages," Melville tells us,

"the houses stand here and there in the shadow of groves or are scattered along the banks of the winding stream; their bamboo sides and their gleaming white thatch forming a beautiful contrast to the perpetual verdure in which they are embowered. There are no roads of any kind in the valley; nothing but a labyrinth of foot paths twisting and turning without end." Yet the morals of these people do not seem to have been so far below our standards as their benighted condition might lead us to expect. "There seemed," says Melville, "to be no rogues of any sort in Typee. In the darkest nights the natives slept securely with all their worldly wealth around them, in houses the doors of which were never fastened. The disquieting thought of theft and assassination never disturbed them. Each islander reposed beneath his own palmetto thatching, or sat under his own breadfruit tree, with none to molest or alarm him. There was not a padlock in the valley."

I had gone so far in one of my readings of Melville, and was beginning to wonder in the back of my head what a Typee introduced into our civilization could find to say of us half as pleasant as the things their guest had noted of them, when I recalled that another had long ago put the like question to himself when he was in much better position to answer it. It was when the New World was very much newer than it is now, that Villegaignon landed in a country he surnamed Antarctic France, where dwelt a people of cannibals the very counterpart (as I judge) of our friends the Typees. "Three of these people," the Sieur de Montaigne records, "were at Rouen in the reign of our late King, Charles the Ninth, who talked with them a great while. They were showed our fashions, our pomp, and the form of a fair city; afterward some demanded their advice, and would needs know of them what things of note and admirable they had observed amongst us. They answered three things," . . . of which Montaigne seems particularly impressed with this one: "They had perceived (they said) there were men among us full gorged with all sorts of commodities, and others which hunger-starved and bare with need and poverty begged at their gates: and found it strange these moieties

[they have a phrase whereby they call men but a moiety one of another]—strange these moieties so needy could endure such an injustice, and that they took not the others by the throat, or set fire to their houses."

I do not suppose Montaigne approved, any more than we can, the touch of savagery that concludes these observations; but on the whole they seem to have confirmed him in certain opinions he had already formed on the pretended advantages of civilized over barbarous life. For this occasion on which he actually met and conversed with the cannibals was not the first acquaintance he had with them. There had long been with him a certain serving-man who had spent some ten or twelve years in their country, and seems to have given his master much the same account of them as Melville has given us of the Typees. I cannot refrain from recalling in Montaigne's own words his reflections on the whole spectacle of savagery and civilization.

"Now I find," he says, "as far as I have been informed, there is nothing in that nation that is either barbarous or savage,—unless men call that barbarism which is not common to them . . . They are even savage as we call those fruits wild which nature of herself and of her ordinary progress hath produced,—whereas, indeed, they are those which ourselves have ordered by our artificial devices and diverted from their common order we should rather term savage. In those are the true and most profitable virtues, and natural properties most lively and vigorous, which in these we have bastardized, applying them to the pleasure of our corrupted taste . . . And if notwithstanding, in diverse fruits of those countries that were never tilled, we shall find that in respect of ours they are most excellent and as delicate to the taste, there is no reason art should gain the point of honor over our puissant mother Nature. We have so much by our invention surcharged the beauties and riches of her works, that we have altogether choked her; yet wherever her purity shineth, she maketh our vain and frivolous enterprises wonderfully ashamed.

Et veniunt hederae sponte sua melius,
Surgit et in solis formosior arbutus antris,
Et volucres nulla dulcius arte cannunt.

All our endeavor or wit cannot so much as reach to represent the nest of the least birdlet, . . . no, nor the web of a silly spider . . .

"Those nations seem therefore so barbarous unto me because they have received very little fashion from human wit, and are yet near their original

naturality. The laws of nature do yet command them which are but little bastardized by ours, and that with such purity as I am sometimes grieved the knowledge of it came not sooner to light, at what time there were men that better than we could have judged of it. I am sorry Lycurgus and Plato had it not; for meseemeth that what in these nations we see by experience, doth not only exceed all the pictures wherewith licentious poesy hath proudly embellished the Golden Age, but also the conception and desire of philosophy . . . It is a nation, would I answer Plato, that hath no kind of traffic, no knowledge of letters, no name of magistrate nor of politic priority, no use of service, of riches or of poverty, no occupation but idle, no respect of kindred but common, no apparel but natural, no measuring of lands, no use of wine, corn or metal . . . The very words that import lying, falsehood, treason, dissimulation, covetousness, envy detraction and pardon were never heard of amongst them. How dissonant would Plato find his imaginary commonwealth from this perfection.

Hos natura modos primum dedit.

I had thought to begin a sound, philosophical account of the nature of progress with a picture, not, if I could help it, unsympathetic, of man's condition before he had felt its benefits. The plan would recommend itself to any philosopher as suitable and convenient to its purpose, yet here am I well beyond the beginning of my discourse, still lingering with the cannibals, and, what is worse, sensible that I have not been diligent to uncover the many causes there must be for rejoicing that we are not as they were. Not that there is any difficulty in pointing to the host of things we can do which they could not. We have only to mount in one of our winged ships and look down on the simple Typee rubbing two sticks together for their spark, to see in all the distance that lies between us the like of what Prometheus scaled Heaven for. But what in all this is there to rejoice over?

It is singular how many have asked this question and found no answer, or have answered—Nothing. I do not cite the licentious poets Montaigne refers to as having invented a Golden Age and feigned a happy condition of man before progress had spoiled the world for him; although these are many and if their wisdom is not of the philosopher's kind yet is it all the closer to "that ancient wisdom of childhood" a wise man does well to keep near him. But even learned

academies have thought the question not beyond their interest and study. In 1749, the Academy of Dijon set for the prize competition of the following year the question, "Whether the progress of the arts and sciences had contributed to the corruption or to the purification of life?" The prize was won by J.-J. Rousseau. His little essay, generally known as the Discours sur les Sciences et les Arts, worked on the thought of its time as seldom so casual a thing. "One cannot," Jean-Jacques wrote then, "one cannot reflect on the ways of life without finding pleasure in recalling the image of its first simplicity. That was a fair shore, bedecked by only Nature's hand, toward which our eyes are ever turning back regretfully as we watch it fade in the distance."

There may be, nay I think there must be, a meaning and a moral to this disgust of the enlightened here and now, this longing for a life not all "sicklied o'er with the pale cast of thought." But the interpretations of this feeling we most commonly meet with are not I hope to be taken very seriously, for if they are, there is no counsel for us but one of despair. Thus, whatever could come of the lament for the good old days, the golden days, before science had done this or that to cloud our first innocence? No history written in such ancient times but that it can recall times still more ancient when things went better with the sons of the gods because then they knew less. And it is still open to any one—traveler, philosopher, poet—to draw what picture he will of far away lands wherein, for that nobody wanted very much, everybody found all he wanted. The subject of this sketch may vary from Diogenes snarling in his tub to a Typee girl dancing in her flowers; from the desert to which the Christian cenobites withdrew to Tasso's bosky places, where, before that vain word *Onore* had been found

> Sedean pastori e ninfe,
> Meschiando alle parole
> Vezzi e susurri, ed ai susurri i baci
> Strettamemte tenaci . . .

But of all this, nothing is serious. nothing sincere,—of all those who lament the past, not one would take the first step toward it, so little is it in man's nature to retreat. Or if anyone would, yet what could he do, save to drag his own sadness into the desert with him? As for the world, it must even go on with its science, though it be but the science of hurting itself.

Wherefore, no less futile than regret for a past we cannot recover, is fear for a future we cannot avert. It is natural that certain conditions arising out of the progress of science should make gentle souls anxious for what is to come. Science is power, and as no man can commit the sins he is impotent to commit, there is a certain safeguard for innocence in ignorance. Only after having eaten of the Tree of Knowledge did our first parents come to mourn outside the gates. No shepherds and shepherdesses conceived the iniquity of Babel's tower and Egypt and great Babylon were of no children's dreaming. Yet must man go on gathering unto himself knowledge with all its power for harm and no warning gesture of the fearful can stay him. Our only comfort can be that however great a power for harm science may bring, it ought to enhance in equal measure the power for good,—did we but know what good and evil were.

Did we but know good and evil! In the suggestion that perhaps we do not, in the suspicion that this is just the knowledge to which science does not help us,—yes, in the fear that it is science itself which throws doubt on ethical standards—is, I conceive, a motive for deprecating the progress of science more serious than the others, and more sincere. Science is, indeed, endlessly critical; no authority of tradition or of general acceptance imposes upon it; nothing for it is finished, nothing fixed: and to those to whom all goodness is in danger the moment one asks, What is good? science may well seem a dangerous growth,—unhallowed in its origin, curiosity, damnable in its outcome, unrest. And yet if as we assume, science must progress, stayed neither by regret for the past nor by fear for the future, then must its questioning spirit

invade every realm of opinion, examine the most sacred of beliefs, look into the very meaning of good and evil.

For this reason we did well, I conceive, to begin a consideration of progress with some account of the skeptics. Science itself cannot quarrel with those who meet its advances with the question, What is the good of you? But it can only begin its answer by asking another, What do you take to be good?

What do you take to be good? Evidently there cannot be two minds, one of which points to the advance of civilization with every confidence that it means the world's betterment, the other conceiving that men may grow wiser and none the better for that, unless *the good* is understood by them in different senses. What are these two meanings tangled in the single word,—*the good?*

It is this question that Immanuel Kant has studied with peculiar care and thoughtfulness in his ethical writings, and there he has made a distinction between two such meanings that seems very much to our purpose. The first, in his stiff, academic way, he calls the *hypothetical* use. Thus, if you were to enquire what would be the best thing to do in order to attain a certain object, your answer would recommend a certain procedure as "good," certainly, but good only on the hypothesis that such and such is your end. Your hypothetical good washes its hands of any responsibility for what, if anything, of some other kind of good or evil may attach to your purpose; it only places its wits at your disposal in devising the best means to this end. Is your purpose to rob a bank?—Then will science set itself to think out for you the best way of robbing a bank. After that, let who will complain that bank-robbing is not a good thing to set about, he cannot deny that you have set about it in a good way.

But it seemed to Kant, as I suppose it would to anyone, that we do not restrict ourselves to this hypothetical use of the term good. There seems to us to be a distinction between a good way of thieving and a way of being good. If so, must there not be a good that is sought for its own sake and not merely for the sake of what it may lead to? Is there not a

categorical, an absolute good? And surely Kant was not very far from the thought of all of us when he sought to identify this absolute good with the moral good, with the object of virtue. Plainly we see that however good a thief a man may become, he does not increase in virtue as he advances in science. And have we not here come upon the ultimate meaning of those who contend that, let the world advance never so in its science, it grows no whit better? Its increase is altogether measured in those hypothetical goods thanks to which the thieves of to-day are indeed better thieves than the crude ones that used to be; but as little as ever do they know, and still less do they care, for that absolute good, that moral world, to have progressed away from which is to have gone backward indeed.

What, we asked of the critics of civilization, do you take to be good? And setting aside those who have idly answered, It was good when the world was young, before *Onor* "bound in nets the tresses Zephyr used to scatter,"—setting aside "licentious poesy" we have found the answer of serious men to be, The world will only be good when it has become moral. Not the growth of science, but the increase in morality is real progress, progress toward the absolute good. We have then only to make plain morality's meaning to have found what progress is.

Morality no doubt, first presents itself to most of us as a set of laws or maxims of conduct to follow which is virtue. These laws we may think of as delivered unto man in God's own voice and carved upon tables of stone. Or, if our image of their origin and authority be not so definite, we may still find moral peace in the thought that what words the still small voice of conscience whispers to us are no less God's words. They are what Antigone took them to be—

> The immutable unwritten law of Heaven.
> They were not born to-day or yesterday.
> They die not, and none knoweth whence they sprang.

If many have been unable to keep the sweet moral confi-

dence of childhood until the end, it is because riper experience has not confirmed to them Antigone's premises, nor mature reflection born out her conclusions. Do they *not* die, these unwritten laws: are new ones, indeed, never born? For a little searching we may find that not a precept marks a virtue for one people at one time, but that elsewhere and else when its ordinance is taken to be vicious. And conversely, we do not have to travel far to find vice turning into virtue. Antigone's own people are not so remote from us as the Mingrelians and Topinamboues; we owe them much that we prize most in our culture and would be proud to match them in more ways than one. And yet, consider their admiration in the way of a man, which, if it was any one, was surely the Wise Ulysses. Now, if there are any two principles of Christian morals more firmly planted in our souls than others, they are the maxims, Be truthful, and, Be kind. But was Ulysses truthful? was Ulysses kind? To present one's unconquered enemies with a wooden horse as a pledge of reconciliation may be an innocent enough thing to do, however bizarre. But to make of this wooden horse a disguised troop ship is not within the strict letter of truthfulness; and to sally forth therefrom to slay your quondam foes while they sleep in the security of your peace does not show a kindly spirit. Yet it does not appear that the Greek gods resented any more than did the Greek people Ulysses' cruel craft: all of which would lead one to suspect that the unwritten law of peoples, if indeed it come from Heaven, must come from only that part of it which is directly overhead at the time.

But let time and place be ever so circumscribed, and men ever so in accord as to their moral maxims, are these maxims at least consistent with one another? Does one bid us be truthful? then another bids us be kind! But how in this vale of perplexities is one always to be truthful yet never unkind? "Yes I know," writes an old gossip of mine and fellow philosopher, "I know. Morality; Duty! But how hard it is to discover what is duty. I assure you that for three quarters of my time I do not know where duty lies. It is like the

hedgehog that belonged to our English governess at Joinville. We used to spend the evening looking for it under the furniture, and when we had found it, it was time to go to bed."

For these reasons, most have abandoned the attempt to define the moral good in terms of maxims, which they take rather to be hypothetical goods in disguise. They are rules indeed, but only rules of thumb, holding "for the most part." If they vary with the time and place, if within the most circumscribed communities they contradict one another, this is because they cannot pretend to be good in themselves, but are only the means which the community accepting them has found by experience to be best fitted for attaining a certain end. It is indeed the end that justifies the means, it alone is the categorical good, and the whole meaning of morality is to be sought in its purpose.

But those who, like David Hume, have sought the purpose that is common to all the discordant moral maxims of history, have found it not in some quality this purpose might be assumed to have without question of him whose purpose it was. No, the moral purpose founds its right to have all other purposes bow to it on nothing but the authoritative position of the one that has chosen this purpose as his. Suppose, with Hume,we found that there was no harmony in the moral ordinances of all the many peoples of history save that each maxim at the time and under the conditions of its acceptance was held to serve the well-being of the community. Now communities are not so different from particular men but that they must, like men, hold their well-being to lie in having the objects of their desire accorded to them. From which it follows that to act virtuously is to make your will conform to the will of the community to which you belong. Descartes has somewhere said that God did not choose this world because it was good, but the world is good because *God* chose it. Just so, a community does not choose its purpose because it is good, but that purpose is good which the community chooses. We might say that, not the good will, but the Good Willer is morality's last word on the subject of the categorical good.

Thus it would seem that all virtues melt into one, and that one is what the late Professor Royce was fond of calling "loyalty," the devotion of my will to the will of another. I am aware that not just *any* other-will, whosesoever it may be, is contemplated by moralists as a fit object of loyalty's devotion. The Other to whom my will should bow, if I would be moral, is generally conceived to be more numerous than I am (e.g. the majority), or more inclusive (the family, the state, the cause), or in some sense higher (God). In short, the Other-will is taken to be, in one way or another, an Over-will, and moralists may differ widely as to which one of several conceiveable Over-wills should be recognized as the Absolute. But for the purpose of this discussion, one illustration of moral loyalty is as good as another, for the difficulty that morality has found in making good its claim to have laid hold on the absolute good lies not, I conceive, in deciding *which* Other-will is sovereign, but in convincing a man that he ought to acknowledge as sovereign *any* other will than his own. One who is told that it is not good for him to remain captain of his soul is bound to ask, Why not? It is morality's way of dealing with this *why* that I would consider in an example which, for being simple, looses nothing that I can think essential to the issue.

In Thomas Hobbes' "Leviathan," one finds an account, clear, legalistic, unsentimental, of the meaning of duty, interpreted as the obligation of your will and mine to bow to a Sovereign-will. The title-page of the first edition (1651) of this work bears the image of a man of heroic size whose body is made up of little men. The little men stand for you and me, the big man is Leviathan. The story of the generation of the living giant made up of living men is in this wise:

"Nature it seems hath made men so equal . . . as that though there be found one man manifestly stronger in body or quicker in mind than another, yet when all is reckoned together the difference between man and man is not so considerable as that one man can therefore claim to himself any benefit to which another man may not pretend as well as he . . . From this equality of ability arises equality of hope in attaining of

our ends. And therefore if any two men desire the same thing, they become enemies, and in the way to their end . . . endeavor to destroy or subdue one another . . . From this diffidence of one another, there is no way for any man to secure himself so reasonable as anticipation; that is by force or wiles to master the persons of all the men he can, so long till he see no other power great enough to endanger him . . .

"Hereby is manifest that during the time men live without a common power to keep them all in awe, they are in that condition which is called war, and such a war as is of all against all . . . In such condition there is no place for industry, because the fruit thereof is uncertain, . . . no arts, no letters, no society, and what is worst of all, continual fear and danger of violent death, and the life of man solitary, poor, nasty, brutish and short . . . It followeth that in such a condition, every man has a right to everything, even to one another's body . . . And consequently, it is a precept, or general rule of reason, *that every man ought to endeavor peace, as far as he has hope of obtaining it, and when he cannot obtain it; that he may seek and use all helps and advantages of war* . . . . From this fundamental law of nature, by which men are commanded to endeavor peace is derived this second law; *that a man be willing; when others are so too; as far forth as for peace and defence of himself, he shall think it necessary, to lay down this right to all things, and be contented with so much liberty against other men as he would allow other men against himself.*"

Thus "the final cause, end, or design of men, who naturally love liberty and dominion over others, in the introduction of restraint upon themselves in which we see them live in commonwealths, is the foresight of their own preservation, and of a more contented life thereby; that is to say, of getting themselves out from the condition of war, which is necessarily consequent to the natural passions of men when there is no visible power to keep them in awe and tie them by fear of punishment to the performance of their covenants.

Now "the only way to erect such a common power . . . is to confer all their power and strength upon one man, or upon an assembly of men, that may reduce all their wills . . . unto one will, . . . which is as much as to say, to appoint one man or an assembly of men, to bear their person, and every one to own and acknowledge himself to be author of whatsoever he that so beareth their person shall act . . . in those things which concern the common peace and safety; and therein submit their wills every one to his will, and their judgments to his judgment . . . This done, the multitude so united in one person is called a Commonwealth, in Latin, Civitas. This is the generation of that great Leviathan, or rather, to speak more reverently, of that *mortal god* to which we owe under immortal God, our peace and defence."

Seldom has the "generation" of an Absolute been so clearly

set forth. We do not suppose, any more than Hobbes himself did, that this word "generation" has any historical significance. Men never lived in the state of nature here defined they never foregathered to reason out in this way the advisability of organizing themselves into commonwealths. Instead of "generation," read, if you will "justification," *i.e.*, the justification in reason for the commonwealth's existence and dominion. Then observe that not only does this great loyalist (the whole Leviathan is one of the loyalist documents of the Civil Wars)—not only does he demand a reason for the loyal faith that is in him, but in the development of this reason it turns out that the absolute is *not another will at all* but only one's own will thoughtfully dealing with others to win for itself a "more contented life."

Now of course it is an absurdity to try to give a reason why any will whatever should be taken for absolute and expect to keep it so; for the very function of this reason is to show what more ultimate end is served by acknowledging this will as master. But if we do follow Hobbes's reason for bowing as deep as we do bow to Leviathan, this reason is that our own deepest desire—or what Hobbes takes to be such—is thereby best served. "For it is," says he, "a voluntary act: and of the voluntary acts of every man, the object is some good to himself."

Why then, that morality which promised to give us a meaning of the good which would enable us to understand how the progress of science with its hypothetical goods might let us stray from or even lead us away from *the* good, has turned out to be itself offering us a hypothetical good, *to be itself an effort of science*,—the science of many wills meeting in presence of but a single world. And this I take to be the fate, not only of Hobbes's, but of all moralities: differ as they may respecting that Other-will they take to be absolute, they all alike recommend a sacrifice of my will to another will, not, indeed, for the sacrifice sake, nor yet for that other-will's sake when all is said, but that my own will may find "a more contented life thereby."

Most of us have let our thought respecting the good of life, stop with the acceptance of those moral goods that the opinion of our time takes to be absolute. These standard objects of loyalty, the state, the hearth, the cause, we serve with devotion and to them make our sacrifice. It is natural we should look with distrust even with hostility upon those who have let their thought go further and have asked, How in serving these Other-wills is our own deeper desire the better fulfilled? And yet, if our analysis is so far correct, this is the most intelligent, the most dignified of questions, for no historic morality has really meant to present itself as a system of sacrifices with no corresponding satisfactions.

But if we ask of the current morality of loyalty, What is the greater contentment bought by each of us at the price of the sacrifices we make in loyalty's name? we come upon serious matters for reflection. There have been those who maintain that current morality cannot meet the demands of intelligence, and as there are two ways in which in buying a thing for a price one may drive an unprofitable bargain, so there are two critics of current morality. The one thinks the price morality asks too high; the other esteems the thing bought of no value. Let me call the one the *Reforming Moralist;* the other the *Amoralist.*

Now the reward morality holds out to all who make sacrifice to it is some ideal of peace, whether it be peace on earth and good will among man, or that peace which passeth understanding. Our reforming moralist then holds fast to the ideal of peace as the deepest of human desires, but questions whether current morality in its uncritical acceptance of traditional loyalties has found the most intelligent, *i.e.*, the least sacrificial way to peace. Thus if he is not blind to the citizen-peace that comes from living in Commonwealths to whose Over-will we particular men make our loyal sacrifices, neither will he accept such nationalism as refuses to sanction covenants of nation with nation to the establishment of their more peaceful, if less antonomous, relations. He sees in that group-will we call the national-will but an historic device for

improving the conditions of private life. He sees nothing but unreformed, that is ativistic and stupid morality in such nationalism as would make the autonomy of the state an end in itself to which private life must forever yield its contentment. There is a sense in which he would say with Remy de Gourmont—

"The life of nations, of groups, of individuals is one struggle against morality. Man pushes on toward liberty, and can accept only such discipline as assures him at the cost of temporary subjection a more agreeable and more complete exercise of this supreme good. All discipline that is not founded in liberty is caduque, and it is for this reason that civilization has always succeeded in surmounting systems of morals."

But if our reforming moralist acknowledges the supreme value of peace, and would only make the pursuit of it more intelligent, our amoralist denies that the human heart can ever rest in peace or even really wants to. Peace, if it were complete, would mean stagnation, will-less apathy, that ennui of life Schopenhauer judges to be worse than any misery the war of aggressive wills can engender. In the Nietzschian man-of-might our amoralist sees his ideal, a will that knows no Over-will, acknowledges no loyalty, but whose motto is "Weltmacht oder Untergang." For him, life shall at least know nothing of ennui, no static, stagnant peace, no Nirvana.

Thus if we approach in an historian's spirit the attempt to think out that world-desirable to make for which is to progress in the only sense the word can have, we find humanity divided between those who desire peace and those who want war. On behalf of peace the moralist points not alone to the misery war brings to the vanquished, not alone to its cost to the victor and to the vanity of his ephemeral winnings; but to that utter loneliness which the war of all upon all makes the only lasting portion of each. A solitude of struggle, without one to cheer the effort, without one to share the joy (if joy it can then be called) of triumph—can any human heart endure, let alone desire war?

But, the amoralist, full of the *certaminis gaudia* turns in disgust from the hopeless state of the peaceful who having nothing more to fear can have nothing left to hope for. Our longing for peace is an illusion of certain moments of war-weariness, but a picture of eternal peace, stagnant, ambitionless, dead—and yet not dead enough—who could endure it, who could really desire peace?

Lonely ambition—peaceful acquiescence in a common lot! The history of human relations is a struggle, more often than not a compromise between these ideals: there is enough inspiring in each to make any man of understanding long for it, there is enough repulsive in each to turn any thoughtful soul against it. Wherefore the gruesome spectacle of world war is but the outer and visible sign of the struggle that goes on every silent moment within the heart of each, as the volcano is but the overt violence of long, sullen rumblings that have gone before. And so things must last if and so long as we really want two irreconcilable ideals: Compromise must follow makeshift, war must punctuate peace, world without end.

Into a world so distraught comes that child of God, that messenger of heaven, the modest philosopher. His cheerful gospel is that all men's ills are curable by taking thought, that men suffer only for their false philosophy. Now of all philosophies none is so false as that which pretends one cannot have his penny and his cake. True it may be in the letter that I cannot keep a certain copper in my pocket and honestly entice a sweet-meat out of the baker's shop. But I must be a sorry philosopher if I cannot keep all the potentiality of future enjoyment the penny stands for and yet have all the actual satisfaction I happen for the moment to visualize in the form of cake. Or to put the thought in less poetic and more general terms, the heart that thinks itself torn by conflicting desires owes its plight to the failure of its imagination to realize that only the formulas in which it has so far expressed its desires are in contradiction, the desires themselves may well enough be reconciled in a larger world-view.

Take our present problem for example. It is impossible you say that I should deny the ambition to conquer for the sake of the love of my neighbor without killing what is most vital in myself. And it is equally impossible that I should give play to my ambition to conquer without losing my neighbor's love and living a lonely struggle. These things are indeed impossible in the world to which the imagination of the past has been fettered,—this little finite earth the fulness whereof is so easily emptied. If to have all that I can win of such meagre fulness is the only meaning I can give to ambition, either I must kill ambition and love my neighbor across a fence, or I must tear down the fence and kill my neighbor. But what if the fault of all this lay not with the darkness of reality, but with the blindness of untrained imagination? What if we could set before ambition a boundless prospect, so that never, far as conquest might reach, could it find cause to weep for lack of more to conquer? What if, in the very conquering of such a world, the gain of one, so far from being another's loss, were the equal spoil of all, yes, and a weapon forged to the hand of all for new victories? Wherefore *then* should ambition yield or love be denied?

But perhaps you will say this *is* but an imagining and a dream. Our humdrum world, the only real one, offers no such object of ambition, and if it did our nature, just human nature, is not such as could understand, still less be fascinated and inspired by it. Does it sound ridiculous to say that our world *is* one that holds out just such a prospect to all who will but see? Aye, and that many a human eye has seen, and having seen remained single to this vision? I will call the promised land the Kingdom of Nature Subdued: I will call the vision the Vision of Science.

In the beginning, Man was Nature's creature and her plaything. Sometimes she seems to have fondled her toy and been good to it, given it pleasant places to dwell in and let the light of her coutenance shine upon it. Those who think only of these rare moments, may sing O bella età dell'

oro! O Paradise, O Paradise! They forget how rare were these moments and how capriciously bestowed. Elsewhere were many griefs of which man could not so much as guess the reason, and if he dared raise his questioning gaze to God he was mocked for his impotence and nothingness: "Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding."

But need makes for perspicuity. Time passed, and some few caught a glimpse of the vision of science: caught it, widened it, brightened it and passed it on. Perhaps their lives were not very happy in a world where they were much alone; but it is easier to tell of their ostensible hardships than of their enthusiasms,—who knows but that even they found here their compt. Time went on, and that Nature which had begun by being so cruel and capricious a mistress became through man's science more and more his slave. Human eyes were not so often turned to the gods in supplication. A Greek slave called out to his fellows, "Why call ye upon the gods? Ye have hands? Wipe your own nose."

The earth yields; step by step death itself gives ground, and shall we think of the stars only to fear them and to read our fate in them? Shall they forever whisper to us their old, taunting questions: "Canst thou bind the sweet influences of Pleiades, or loose the bands of Orion? Canst thou bring forth Mazaroth in his season? or canst thou guide Arcturus with his sons? Knowest thou the ordinances of heaven? canst thou set the dominion thereof on the earth?"—And shall we always answer, Alas!

But I am dreaming a dream. Is it though so ill a thing to dream, if one does not forget how to laugh the while? Yes, I know, the stars are rather big for our frail hands to play with even as all Nature once played with us. But how else am I to say that there is nothing in Nature that can forever resist the onward march of science? What else am I to say when the same master equations hold in heaven as on the earth, and Arcturus with all his sons is but a falling pebble painted large?

Let us dream then and laugh with Aesop at his frog. It is certain that neither our laughter nor our dreams can hurt our wise neighbor very much, and if we go the toilsome way toward the conquest we dream of, he or one that comes after may sometime look back on us and say, Yes, that was Progress. *The measure of man's cooperation with man in the conquest of nature measures progress.*

SPECTRUM ANALYSIS

By Arthur W. Goodspeed

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"Spectrum Analysis" denotes the general method of investigation based upon the examination of radiant energy emitted by various sources. Until within about ten years the radiation was studied by means of a prism or diffraction grating. It will be recalled that Newton in 1672 formed the first spectrum and so made the first experiment in spectrum analysis when he showed by means of a triangular glass prism that ordinary sunlight is really composed of many colors, with which we are all familiar, ranged from red to violet. Newton's experiment may easily be made using the electric arc light instead of the sun.

An arrangement of devices into a composite piece of apparatus for examining radiation is called a spectroscope, or for exact measurement a spectrometer. In a simple form it consists of a graduated circular table, for measuring angles, a prism or grating at its center for dispersing the radiation, a collimating tube for rendering the rays parallel and a telescope or photographic camera for viewing or recording the result.

The history of this science may be said to start with the experiments of Wallaston in 1802 and of Fraunhofer in 1814 who noticed in the spectrum of the sun certain dark lines crossing it perpendicular to its length. Fraunhofer mapped nearly 600 of these lines. Eight of the most prominent he designated by the first eight letters of the alphabet the lines A and B lying in the extreme red, C in the orange red, D in the yellow, E in the green, F and G in the blue and H in the violet. Later he added *a* in the red and *b* in the green.

I am using the term radiation instead of light quite advisedly since light should be defined as only that portion of radiation which can produce a sensation in the eye, it having been long established that this is a very small part of the whole. The earth receives from the sun a large amount of energy. There seems to be but two possible ways by which it can come through the intervening space, namely by means of moving matter or by means of a kind of wave motion analogous to sound propagation. Thus arose two rival theories of light, the corpuscular theory, long ago abandoned, and the wave theory which is far more satisfactory in explaining the various phenomena. The speed of light is so great that it was long thought to be infinite. In rather modern times it has however been measured with great accuracy and this constant of nature plays a very important role in the philosophy of modern science. Though the sun is 90,000,000 miles away its light comes to us in about 8 minutes, but at this enormous speed it takes over 4¼ years to reach us from one of the nearest stars, alpha Centauri. Thus the light years about six million miles furnishes the astronomer with a measuring rod convenient and appropriate to the vast spaces to be measured.

If then radiation is propagated by waves, they must have a definite wave—length, the body emitting them must vibrate with a definite frequency n, the universal relation, $v = nl$, holding where v is the speed of propagation. In this paper we shall be concerned chiefly with the different wave-lengths of radiation which have an exceedingly wide range since waves in the æther a mile long and more can be produced and measured while the shortest yet discovered have the order of magnitude of four millionths of a cm. A method for actually measuring wave-lengths of light was developed by Fraunhofer and published in 1821 in a paper he read before the Munich Academy of Science. He used the principle of diffraction and constructed his first gratings by winding a silver wire screwwise around a brass frame. Later he made some by ruling equidistant and parallel straight lines on flat glass plates. Thus Fraunhofer's work is far more important than

is usually supposed, since it laid the foundation for modern wave-length measurements of great accuracy.

Gratings similar in principle to those of Fraunhofer have been made by fine rulings with a diamond on glass, steel or speculum metal, by Saxton, Nobert, Rutherford, Rowland and Michelson, those of the last two investigators far surpassing any previously made. Some of these are concave acting to produce images by reflection and without the aid of other optical apparatus.

The physical significance of the dark lines in the solar spectrum was of course unknown to Fraunhofer and the matter was not understood until 1859 when Kirchhoff completely explained it as a result of his own investigations. The well known law of Kirchhoff may be stated as follows: The relation between the emitting power and the absorbing power for the same wave length is constant for all substances at the same temperature. We may infer therefore that the particles of a substance when excited vibrate in certain definite ways which depend on their chemical and physical nature and that these vibrations give rise to waves in the æther. The converse of this follows naturally, that the same particles respond easily to these particular vibrations and absorb them, presenting a case analogous to resonance in sound. Kirchhoff thus explained the dark lines in the solar spectrum. He thought of the sun as surrounded by a layer of vapors of many substances composing the sun within, these vapors acting as filters to the "white" light emitted from within and absorbing therefrom just those rays which correspond in their period of vibration to those of the component particles of the vapors. The Fraunhofer lines thus tell us of the composition of the sun or other heavenly bodies, the presence of an element in the body being indicated by the coincidence of the lines in its emission spectrum in the laboratory with lines in the spectrum of the sun or star.

Thus we see the dawn of a new science and two branches of knowledge which formerly seemed most remote, namely astronomy and chemistry, have their interests united in the

study of celestial chemistry—by means of the spectroscope. The progress which has been made in this department of learning has been so rapid and the field so promising, that the well instructed youth of our time, instead of idly repeating the simple jingle of our childhood

"Twinkle, twinkle, little star,
How I wonder what you are"

simply directs his pocket spectroscope to the object of his admiration and obtains exact information as to what the star is, chemically and physically. The results which have already been obtained not only in celestial chemistry but in other branches of spectroscopic science are so surprising and apparently so remote from the range of ordinary experience that one can appreciate these wonderful discoveries only by tracing the steps by which they have been reached.

Kirchhoff and his contemporary Bunsen were the first who had laid the scientific foundations upon which alone a method of investigation could be built and who must therefore be regarded as the true discovers of Spectrum Analysis. The great sensitiveness of the spectrum method led Bunsen to the discovery of two new alkaline metals caesium and rubidium denoted by their blue and their red lines respectively. Subsequently Crookes found by the same means the lead-like metal thallium distinguished by a brilliant green line and Reich and Richter the zinc-like metal indium. It has been estimated that 10^{-8} part of a grain of sodium can be detected by the production of its line. In fact the fresh ash of a cigar moistened with hydrochloric acid and ignited in the flame of a Bunsen burner at once shows the principal lines of sodium, potassium, calcium and lithium.

In 1868 A. J. Ängström published what he termed a normal solar spectrum in which each line was placed according to its wave-length. This great work was done by means of three gratings ruled on glass by Nobert and the wave-lengths were expressed in ten-millionths of a millimeter a unit equal to 10^{-10} of a meter and therefore sometimes called a tenth-meter

or more frequently an Ångström unit. Later Thalén corrected and extended Ångström's measurements. The publication of Ångström's map marks a definite step in the development of spectroscopy. For the first time a standard of reference, placed upon a physical basis, was constructed. The determination of wave-lengths of lines in the spectra of unknown substances was now possible by a direct comparison with a sun spectrum.

Although the work of Bunsen, Kirchhoff and Thalén had referred only to the visible part of the spectrum it had been found by Sir William Herschel in 1800 that there is an invisible spectrum beyond the red end which produces the greatest heat effect upon a thermometer. In 1840 Sir John Herschel proved the existence of absorption lines also in this so-called infra-red region. This consists of rays of longer wave-lengths than those of visible light which when incident on a black surface are absorbed as heat and so may be easily examined by means of a thermopile, this instrument and other heat absorbing devices having been since developed to great sensibility. The bolometer of Langley is an example of these, and a far more sensitive instrument has more recently been developed by Coblentz at the Bureau of Standards.

Soon after Sir William Herschell's discovery of the infra-red Ritter and Wallaston discovered the ultra violet and in 1842 Becquerel showed by photography the presence of Fraunhofer lines in the region, and mapped them down to about 3400 Ångströms, glass absorbing most of the waves shorter than this. It should be noted that the visible spectrum extends from about 7600 to 3900 Ångströms but by various means emission spectra have been traced between the limits of about 3,140,000 and 400 Ångströms. The history of these researches is very interesting but only a very little can be included in this treatment. Quartz when substituted for glass in the optical parts of the apparatus permits one to investigate from 3400 to 1850; then by using fluorite in vacuum Schumann reached an estimated value of 1200. Later Lyman of Harvard with great labor and skill succeeded in pushing this limit to about 600.,

and recently Millikan and Sawyer have observed waves as short as 320.

It was nearly a quarter of a century before Ängström's map was superseded. This was first done by Rowland of Johns Hopkins who published a complete normal photographic map of the sun spectrum, based upon a notable advance he made in the ruling and mounting of gratings. This map was about 20 meters long with a scale of wave-lengths attached, the maximum error in any part being estimated to be less than 0.01 Ängström units. Rowland's map differed slightly from that of Ängström and Thalén but because of the obvious accuracy of his method and work his scale was universally adopted as the standard of reference and remained so for about fifteen years. In 1894 Michelson determined the absolute wave lengths of three lines in the spectrum of cadmium in terms of the standard meter in Paris. The interferometer method was used in this work the details of which cannot be discussed here. The lines were measured with an extraordinary degree of accuracy and since the method is free from all the inherent errors of grating measurements the values of the three wave-lengths given by Michelson are deemed accurate in the highest degree.

The values are

red line	6438.4722 Ä. u
green line	5085.8240 Ä. u
blue line	4799.9107 Ä. u

At various meetings of the International Union for solar Research from 1905 to 1910 it was decided that the wave-length of the red cadmium line should be taken as the primary standard of wave-length, that its value should be fixed as 6438.4696; that the unit should be named the Ängström; and further that a series of secondary standards not more than fifty units apart should be determined by interferometer methods in terms of the primary standard. The iron arc was chosen to furnish the lines for the secondary standards and the value of each was the mean of three independent observers.

The wave lengths of fifty four lines were published by the committee of the International Union having the work in charge. A list of nearly four hundred other lines in the arc spectrum of iron has been published by Kayser as tertiary standards but as a result of these measurements it is thought that there still exist errors of as much as 0.004 to 0.005 Ängström in some of the secondary standards. This indeed seems very small.

As might be expected many attempts have been made to find some relation between the wave-lengths or the frequencies of the several spectrum lines of a given element. The first important generalization made by Balmer in 1885 in the spectrum of hydrogen will serve to illustrate. He showed that the wave-lengths of the first nine lines of the hydrogen spectrum can be expressed by the equation

$$l = h \frac{m^2}{m^2 - 4} \times 10^{-8}$$

where h is a constant and m is given the values 3, 4, 5 etc. up to 11. The value of h was found to be 3645. Soon many more lines were found to fit Balmer's formula and a test on a large scale was made in 1898 when measurements by Evershed were made from photographs of the solar eclipse of June twenty-second. In all about thirty lines were measured and their wave-lengths compared with those given by calculation from the formula with the result that the difference was never more than a few hundredths of an "Ängström." A number of other formulas for different elements have been found by Rydberg, Kayser and Runge and by others the details of which are found in the special literature on the subject.

Very interesting information can be gained from spectra of the heavenly bodies other than knowledge of their chemical and physical constitution. Döppler's principle by which the apparent pitch of a sounding body is raised when it is moving toward the ear and lowered when receding applies also to light waves. While a source of light is moving toward the observer the effect is to shorten the waves received while if it is moving away the waves are lengthened. Since the posi-

tion of each line in the spectrum depends on the corresponding wave length, it is evident that if a body giving a bright-line spectrum were moving towards the earth, all the lines would be shifted a little toward the blue end of the spectrum, while if it were moving away from the earth its lines would be slightly displaced towards the red. From the amount of the displacement the velocity of the source relative to the earth may be readily found. This method has also been used to find the velocity of the sun's rotation on its axis, for it is clear that one edge in its equatorial region is moving away from us while the opposite edge is approaching with equal velocity. The technic is to measure the line displacement for the two opposite edges and a simple arithmetical calculation brings the result. It has been found that by measuring such displacements on photographs of stella spectra the speed of stars in the line of sight may be determined with an error of less than a half mile per second Most of the stars which have been investigated have velocities with respect to the sun of between one and fifty miles per second. A majority of them on one side of the heavens have a general relative motion toward the sun, while those on the opposite side are moving away from the sun.

In some cases stellar lines become double, separate, and come together again at regular intervals, while in other cases the lines remain single, but oscillate slowly about a mean position. In these cases the light evidently comes from double stars. In the former as the two components revolve about their mutual center of mass, one will be approaching us while the other is receding. This causes displacements in opposite directions except when both stars are moving at right angles to the direction of sight when the lines will coincide. In the second case the same conditions must prevail except that one of the star components must be dark.

At intervals of about sixty-nine hours the variable star Algol, as viewed in the telescope, has minima of brightness probably due to the eclipse of a bright component by a dark companion. The oscillations of its spectral lines have the same period and lead to the same conclusions The orbital

velocity of Algol determined by the maximum displacement of its lines is about 25 miles per second. A similar case is presented by the double star Beta Aurigæ. Its orbital period is four days, its velocity seventy miles per second and its orbital diameter at least 7.5 million miles. From well known laws of dynamics it can further be shown that the mass of each component is twice that of our sun. All this then has been learned from the spectroscope since the components of the double stars having their parts the closest possible to be seen double by the telescope are about three hundred and fifty million miles apart—*i.e.*, four times the distance from the earth to the sun.

In what has preceded nothing has been said about the mechanism of the emission of the radiation. If the latter is a wave motion something must vibrate in the act of emitting a wave or group of waves. If a single tuning fork vibrates a single wave of definite length is emitted and travels through the air in all directions. If a single composite harmonious tone be sounded by say a twenty piece orchestra a very complex sound wave results which could probably be analyzed into its simple components which would include very many different frequencies and different amplitudes. Now most spectra result from a very complex initial vibration similar to that producing the orchestral tone. This is evident from the obvious complex characters of the spectra themselves. All this then leads us to a study of the structure of the molecule and of the atoms composing it. Chemistry treats of molecules in their relation to atoms and a vast amount of definite knowledge exists on this subject. A study of the structure and of the dynamics of the atom and of its parts however has become in recent years a very important subject in Physics. The work of Sir William Crookes over forty years ago on the discharge of electricity through high vacua and the discovery about twenty years later of the X-Rays by Roentgen and of radioactivity by Henri Becquerel led the way to a study of the internal structure of the atom which would before then have seemed impossible.

Although Crookes himself did not carry his early experiments to a point leading then to any final conclusions, so remarkable were his results that he thought the particles composing the cathode stream constituted a fourth state of matter which he called "radiant matter." To quote his own words "we have actually touched the borderland where matter and force seem to merge into one another. I venture to think that the greatest scientific problems of the future will find their solution in this borderland and even beyond." Later he spoke of the "Ultimate or rather ultimatissimate particles moving with incredible velocity," and of the possibility of elements of atomic mass higher than that of uranium dissociating into simpler atoms. When we note that these comments were made over fifteen years before the discovery of radioactivity and of the X-rays they seem prophetic indeed.

It has developed as a result of the more recent researches of Rutherford, of J. J. Thomson, of Millikan and of many others that the little bodies in a Crookes tube to which its properties are due are atoms of negative electricity having a mass inertia about $1/1700$ of that of a hydrogen atom. These particles are now called electrons and each has a mass of 96×10^{-27}g. The radioactive process consists in the spontaneous partial disintegration of some of the most massive atoms, such as those of uranium and thorium, by an explosive ejection of electrons and also of positively charged bodies which have been proved to be helium atoms after having become electrically neutral. The positive particles are called alpha particles and the radio electrons beta particles. Simultaneously with the ejection of a beta particle there starts a very short wave of radiation called a gamma ray. The X-rays are also very short waves and are generated in the vacuum tube when a stream of moving electrons is made to impinge upon the surface of matter—one of the heavier metals such as platinum or tungsten usually being employed to demonstrate the phenomenon. X-rays are in general perhaps ten times as long as gamma rays but many fold shorter than extremely short ultra violet waves. We seem then to have found a mechanism, that is the atom, of sufficient

possible complexity to account for the highly complicated spectrum of the radiation emitted by it. Furthermore this conclusion is quite consistent with the Maxwell-Lorentz electromagnetic theory of radiation, since the aether waves result from the vibrations of the electrons, which have been proved to be real charges of electricity producing magnetic fields by their motions. In this theory it was assumed that the elementary atoms consist of a number of small, electrically charged particles vibrating independently or revolving about a common center and that radiation results from their transverse vibrations. When a substance is placed in a magnetic field the motions of the electrons are influenced so that changes are made in their vibration periods. This is known as "the Zeeman effect," and an exhaustive experimental study of it has been most satisfactory in confirming the electromagnetic theory.

It is quite clear that a complete understanding of the mechanism of radiation involves an intimate knowledge of the true structure of the atom as composed of positive and negative electric charges. Consequently any one new truth concerning either of these has an important bearing on the other—in fact it is intimately associated with it. For example if we could at will indefinitely magnify a single atom of hydrogen and observe by the eye its actual behavior most if not all of the difficulties in the study of radiation would be solved at once. As such a mode of direct observation is impossible, the various conclusions arrived at in the study of atom structure and those resulting from a study of radiation and its spectra must be mutually consistent. The discovery of radioactivity and its detailed study have led to several definite proposals as to the arrangement of the electrons with reference to the associated positive electricity. A serious difficulty usually met is either the lack of stability of the proposed structure, or the difficulty in explaining radiation by means of it. As an example of these proposed atoms I may mention the Rutherford-Bohr atom and also the structure suggested in this country by Lewis and Langmuir. The former may be called kinetic and is similar

to the solar system in that it has a central body like the sun called the nucleus and a system of revolving electrons like the planets. The nucleus is positively charged, the whole system being electrically neutral and in dynamic equilibrium. The simplest atom is of hydrogen with one electron revolving around a positive nucleus of equal amount electrically. Such an atom is also similar to the solar system in the relative sizes of its parts and the distances between them. Again the nucleus like the sun has nearly the whole mass of the system since it has been stated that at least in the hydrogen atom it is known to have above 1700 times the mass of the electrons. The process of radiation of such an atom may be quite consistent with the theory of Max Planck, advanced in 1910, the essential point of which is that the energy radiation from an atomic system does not take place in the continuous electrodynamic way but on the contrary that it takes place in distinctly separate emissions, the amount of energy coming from the system in a single emission being to $\tau h\nu$, where τ is a whole number ν the frequency of the vibration and h a universal constant. This is what is known as the quantum theory of radiation. In applying it we suppose that an atom can assume various so-called stationary states of equilibrium with its planetary electrons revolving about the nucleus. These states constantly shift from one to another by the jumping of an electron from one orbit to another with an accompanying radiation of definite frequency ν, the energy always being equal to a whole number of quantum units.

Various investigations have indicated that the number of electrons in an atom is approximately equal to one half the atomic mass referred to hydrogen. As hydrogen itself must be an exception van den Broeck suggested that the number of electrons in any atom may be equal to the number identifying the element when all are arranged in the order of their increasing atomic masses. Thus hydrogen would have one, helium the second element with an atomic mass of four would have two electrons, carbon six and so on. This "atomic number" arrangement has proved very important in both physics and

chemistry. The most notable early experiments involving the subject of atomic numbers were those of Moseley on the "High Frequency Spectra of the Elements." Many unsuccessful efforts had been made to reflect, to refract, and to diffract X-rays this work beginning at their discovery in 1895. We now know that the difficulty resulted from the extreme shortness of the waves. Reflection of light occurs because the flaws in the surface are small compared with the wave length, but these become important when X-rays are concerned and the surface is much as sandpaper is to ordinary light. Professor M. Laue of Munich however in 1912 suggested that, if X-ray wave-lengths were of the same order of magnitude as atoms, crystals might serve to produce diffraction effects with X-rays by reason of the regular grouping of their atoms as affirmed by crystallographers who have gradually developed the theory suggested by Bravais in 1850 that the atoms of a crystal reside at the angular points of a so-called "space-lattice," the details of which depend on the crystal system. This theory was tested by the experiments of Friedrich and Knipping and at once proved sound. Later W. H. and W. L. Bragg of Cambridge showed that X-rays could be regularly reflected from the cleavage planes of crystals, and their work with that of Moseley resulted in finding the wave-lengths and frequencies of these rays. Suppose for example we have a crystal of the cubic form. If now we know the mass of an atom of which the crystal is made up, then the density of the crystal divided by the atomic mass gives the number of atoms per unit volume. Also $N = n^3$ and $(dn)^3 = 1$ in which N is the number of atoms per unit of volume, n the number on an edge of that volume and d the distance between the atoms. From all this clearly $d = \frac{1}{\sqrt[3]{N}}$ which is also the distance between the reflecting planes.

Furthermore the wave-length of the first order spectrum is found from the usual diffraction formula $l = 2d \sin \phi$ in which ϕ is the angle of reflection. Thus by means of some simple crystals we have measured X-ray wave-lengths and

then by using these values on unknown and more complicated crystals, the form and atomic arrangements have been investigated. It was shown that there are two kinds of X-rays a more penetrating group or so-called hard rays denoting the K series and a soft kind called the L series. Moseley used a large number of the elements as anodes or targets in X-ray tubes and measured the frequencies of the X-rays produced. He found that the frequency increases with the atomic mass of the element generating the rays. Each element produced two characteristic lines and the pair moved progressively along the photographic plates in passing from one element to the next higher of atomic mass. Thus a remarkable relationship was established expressed by the formula, frequency = A $(N - b)^2$, in which A is a constant and N is a whole number increasing by unity in passing from any element to the next higher in atomic mass, and $b = 1$ for the K series. If now for any particular element we substitute its atomic number for N and measure the frequency of is X-radiation by experiment, the value of A to apply to all elements can be found. If A thus found be used in the above formula and the latter be solved for N in terms of frequency, it was found by experiment on measuring various frequencies that N is the atomic number in each case. Thus Moseley verified the atomic numbers of aluminum 13, selicon 14, calcium 20, iron 26, cobalt 27, nickel 28, up to silver 47. With elements of higher atomic mass the L series was used and the frequencies measured up to gold 79. In this series five lines were found instead of two. The same formula applied with different values for the constants A and B. In this work it was found that every number from 13 to 79 applied to a known element except three. These three may have once existed and by the gradual process of inorganic evolution become extinct or they may at some remote future time appear in sufficient quantity to be detected, or yet they may now be present having as yet escaped observation. Up to the present time X-ray spectra have been obtained emitted by all the known stable elements except ten. This work of Moseley's was indeed remarkable and it is to be deeply

regretted that he was chosen by his government to present his body as a target for German bullets with a fatal result rather than to use his fertile brain at home for the solution of some of the many great war problems. Before the discovery of radioactivity and of the various radio-elements many atomic number gaps would have appeared between bismuth 208 and uranium 238. At present however the places are practically all filled with the radio elements referred to.

Thus we see a very intimate relation between the structure of the atom and its behavior and radiation as revealed by spectrum analysis. Any new truth discovered in the one is sure to lead to something of corresponding interest in the other. With the addition of X-rays and gamma rays to the list of electromagnetic waves previously known, the table of wave lengths is greatly extended in one direction. It is said that the longest Hertzian waves yet generated are nearly ten miles long while the shortest are a few millimeters. Those used in wireless communication are from three or four miles long down to a few hundred yards. Between the shortest Hertzian waves yet generated and the longest infra-red there is a short gap which will surely be closed in time. The longest infra-red rays are about 0.1 of a millimeter and from these to those nearly as short as 10^{-6}, we have the whole visible spectrum and the ultra violet. Then there is another gap before we get to the X-rays of the order of 10^{-8} cm. and the gamma rays, 10^{-9} cm.

The following table summarizes these results:

Kind of wave	*Wave-length*
Hertzian waves	down to 0.4 cm.
Infra red	0.01 to 7.7×10^{-5} cm.
Visible light	7.7×10^{-5} to 3.6×10^{-5} cm.
Ultra-violet	3.6×10^{-5} to 10^{-6} (about)
X-rays	10^{-8}
Gamma rays	10^{-9}

Thus we have briefly surveyed what Kaye calls "the riddle of modern Physics" and while it is not likely that exact agreement will result in the near future surely scientific

investigators are gradually approaching a unity of mind in many details. The speaker in this series six years ago closed his lecture on "What is Electricity" with these words—"we find ourselves now face to face with a single problem instead of many, the solution of which would open wide the door to a comprehensive knowledge of many things now unknown and formerly unknowable." The structure of the atom was here referred to. We must now and we might better then have referred to the duplex aspect of this same problem viz. the structure of the atom and the mechanism of radiation.

ANTWERP AS A COMMERCIAL CENTRE

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No other phase of the post-war reconstruction is calculated to inspire more optimism than the return of Antwerp and Belgium to their political and economic freedom. The fall, in October, 1914, of the great city with its busy quays and harbors on the lower Scheldt cast a never-to-be-forgotten gloom over the allied nations. It was well known that Germany had coveted the city with its rich tributary territory for a long time. She saw in it the potentialities of a great, if not the greatest seaport of the world. Its conquest was therefore a tremendous stride forward toward the goal of world domination. For four long years, Antwerp in the possession of the enemy gave to that ambition an ominous element of reality. Fortunately, there is now no question of this key position of western Europe being under any flag save that of Belgium. The revival of Antwerp as a centre of commerce and civilization is being looked forward to by all friends of justice and fair play with confidence and satisfaction.

The unusual possibilities of Antwerp as a commercial centre are less generally known than students, who are more familiar with the subject, suppose. Most persons look on Antwerp as an excellent city enjoying relatively about the same position with respect to the larger cities of Europe as does Boston to New York. Very few have any notion of the extraordinary growth of its commerce in the decades before the war. Fewer still realize that in the late nineties its foreign trade surpassed that of London, while the net tonnage entering and leaving its harbors in 1912 actually exceeded that of New York.

The city and harbor are located about fifty miles up the

Scheldt. It is by its geography the natural emporium of the most active commerical and industrial section of the world. It is the centre of northwestern Europe, the area on which there has developed since the geographic discoveries of the 15th century, the greatest industrial and commercial life known to history. For the past three hundred years this region has been the seat of modern civilization, and Antwerp is its hub, the cross-roads of its highways; the natural emporium of the North Sea basin, comprising on its continental side alone, over 90,000,000 people.

More immediately it is the exclusive harbor for Belgium, comparatively one of the richest manufacturing and agricultural countries of the world.

Nowhere else could there be found in the years immediately before the war a more highly developed and intensive economic life than in little Belgium. Thus on an area of 11,373 square miles she supported a population of 7,658,000, that is 670 or nearly 700 persons per square mile, or a greater density of population than is to be found in any other nation. In the United Kingdom there were 380, in Germany and Italy over 300, in China 200, in India 175 and in Pennsylvania 170, while the average for the United States is 34. On the Belgium basis, the total population of the United States would be more than two billions and that of Germany 150 millions. Belgium maintained 4565 kilometres of heavy and 4200 kilometres of light railways, or a total of 298 kilometres per square kilometre. A similar ratio would have given Germany 161,000 instead of 62, 213 kilometres of railways.

The average size of the Belgium farm is only about ⅓ that of the English farm, that is 14.3 acres instead of 34. The very large holdings which form so conspicuous a part of the English land holding are almost entirely absent in Belgium, yet nearly all the farms small though they are, are owned by those who work them. The coal production of Belgium was 23 million tons, or over 3 tons per capita. A similar ratio would have given Germany 201 million tons instead of only 177 million. The foreign commerce of Belgium in

1913 was 8765 million francs, or 1144 francs per head. At that rate the foreign commerce of Germany would have amounted to about 75 billion francs, whereas it was but 24 millards.

The basis for this remarkable development which may well be compared with that of the area composed in a semicircle of 150 miles in radius from New York, is unusually varied. In addition to the exceptionally fine geographical location already described, the territory immediately tributary to Antwerp, its "hinterland," enjoys all the advantages of an economic geography of unrivalled excellence. Its industrial life is built up on the firm foundations of two great coal deposits lying end to end across the centre of Belgium from France to the German border. To these there was added, some years before the war, another equally rich and extensive coal field in the Campine district near Antwerp, the presence of which assures an abundant supply of coal for many years to come.

In the matter of food the region is equally fortunate because the fertility of the Belgium farms through intensive farming added to the facilities for importation and distribution *via* Antwerp serve to keep down the cost of living and secures a relatively cheap food supply. The importance of this in an industrial area is of course evident.

Equally important is the well recognized fact that Belguim's dense population is amazingly industrious and possessed of great productive energy. More than two thirds of Belguim's seven millions live by industry and only one third on the land. Yet Belgian cities are peculiarly free from the slums which form so characteristic a part of most industrial cities. The population is widely distributed in many towns of relatively small size. And although the houses are often mean and poor, very many of the workers families are thus able to have small plots of ground for gardens.

Historical Background

Antwerp appears first in history in the 7th century. "But its situation at the open mouth of the great estuary of the

Scheldt exposed to every passing piratical invader rendered it unfit for the purposes of early commerce." During the 9th century it suffered severely at the hands of the ubiquitous Norsemen. But in the 11th century it appears again in the chronicles of the period as the capital of a margraviate under the Duke of Brabant, Godfrey of Bouillon being its most famous over-lord. This was in the days when Flanders, semi-independent and under its own counts occupied a middle position geographically and politically between France and the Empire, and comparatively free from the wars that affected them. Flemish cities enjoyed a preeminence in the civilization of the north similar to that of the city states of Italy. Of these Bruges, connected with the sea by its canals and sufficiently inland for safety, attained an enviable leadership in the 14th and 15th centuries. But under Maximilian of Austria it lost in favor and its trade was transferred to other cities, mainly to Antwerp.

The discovery of America and the route to India by the Cape of Good Hope revolutionized both commerce and navigation. Vessels were built larger and of deeper draught. The shallow canals and rivers of Bruges, Ghent and Brussels were no longer adequate. On the other hand the deep spacious and open port of Antwerp was perfectly adapted to the shipping of the new epoch. Its commerce increased by leaps and bounds, attracting to itself the most important commercial enterprises of the period. The Merchants Adventurers of England had chosen it as the residence of their Court as early as 1407. The Fuggers of Augsburg left Bruges for Antwerp in 1505. the Hanseatic League established itself there in 1545, the Venetian fleet made it the principal port of call for its trade in north European waters, while the Portuguese, Dutch, Genoese, like the Venetians, Germans and English, all had their entrepots in the city on the Scheldt. By the middle of the 16th century it had far surpassed all rivals in wealth and prosperity. Even the Italian cities acknowledged its preeminence and Antwerp was regarded as the Venice of the North. The learned Florentine historian of this period,

Guicciardini, writes enthnsiastically of the extent and value of its trade.

The great Fairs of Antwerp like those of Leipsic in later times attracted thousands of merchants from all parts of the world. "The chief imports were wool and other agricultural products from England, grain from the Baltic, wines from France and Germany, spices and sugar from Portuguese territory, and silks and oriental luxuries from Venice and other parts of Italy. The exports were manufactured goods of Flanders and Brabant, countries which still took the lead in textile fabrics, tapestries, carpets and many other important industries."

The first of European cities to establish a Bourse, it soon became the financial center of the world. Financial transactions of great international significance were made. To students of English history the activities of Sir Thomas Gresham will, of course, come to mind at once. Millions of pounds sterling changed hands without disturbing the business equilibrium. Guicciardini estimates the merchandise imported in 1560 at ninety million florins, while Scribanus in his history "Antwerpia" reports having counted 2500 ships on the Scheldt, over one hundred arriving daily. The population of the city at this time, according to the former, was about 100,000, but the local historian of Antwerp puts it at 200,000.

From the beginning its citizens, like those of so many other cities of the Low Countries, showed intense love for liberty and freedom. In the famous statute of 1290, the magna charta of Antwerp, individual and civil rights were guaranteed. Foreigners were secured in their rights and privileges by special charters, the terms of which were scrupulously observed.

It is to this period of wealth and prosperity that Antwerp and Belgium owe most of the buildings and works of art that still adorn it It reflects both in its spirit and form its democratic and commercial background and is in strong contrast to the regal and monarchical art of France, or the princely and aristocratic art of Rennaissance Italy. The art of Belgium is essentially commercial. "In place of the regal and private

palaces there are town halls, exchanges, belfries and guild halls. Instead of the pictures of kings, popes and madonnas, there are portraits of the solid burghers and merchants and of the patron saints of the town or the guilds. They are overloaded, says Grant Allen, "with details of fur, brocade, jewelry, lace, gold, silver, polished brass, glasswork, oriental carpets, and richly carved furniture." In order to understand Flemish art, therefore, it is necessary to bear in mind at every step that it is the art of the Venétians of the North, of a people essentially commercial and republican.

Unfortunately all the busy happy life of the earlier period of Antwerp's prosperity was interrupted and destroyed. A variety of causes, some of them strangely artificial in their nature, but none the less powerful in keeping away trade from one of the most natural ports of the world, account for this. The troubles began with the revolt of the Netherlands from Spain and the failure of the southern provinces to win their independence. Antwerp suffered terribly. In 1576 Philip II unloosed the "Spanish Fury" upon the city for three days. The town hall and nearly 1000 buildings were burnt and more than 8000 people ruthlessly massacred. It was besieged in 1583, and again in 1584. The second time it resisted for an entire year, but finally succumbed, and the fury of the Spaniard was again unleashed. Under such conditions commerce fled the port. London, Amsterdam, Rotterdam and Hamburg gained what Antwerp lost. Capital and credit, the spirit of enterprise, initiative, and the institutions and organizations of international commerce disappeared.

But this was far from the full measure of Antwerp's misfortunes. Having ruined her commerce, her enemies combined to prevent its revival by erecting an impassable barrier against all commerce on the Scheldt. After having beaten and trampled upon the "broken city," her enemies put shackles on her. First among the enemies were, of course, the Spaniards, but the closing of the Scheldt was due to the former compatriots of Antwerp, namely the Dutch. More successful than the 10 southern provinces, the 9 northern prov-

inces of the Spanish Netherlands had won their independence from Spain and established the Dutch Republic. They conquered the Brill at the mouth of the Scheldt, and thereby the control of Antwerp's commerce. In the negotiations for peace in 1633, they insisted on the continued exclusion of all commerce from the Scheldt, and in the Peace of Münster in 1648 this was granted and written into the international agreement. This rendered the revival of Antwerp impossible and for a century and a half the most favorably located commercial city of Europe languished like a provincial town. Her population dwindled to 40,000. What was left of the docks and basins fell into decay for lack of use, and grass grew in the streets.

Repeated efforts were made to break the economic bondage but without success. Joseph II, backed by England then at war with Holland, tried to open the Scheldt. "Why," he asked, "Am I debarred from using my river?" The British representative at Antwerp, told the Belgians, "The Scheldt was a Belgian river in the 16th century and must be so again." There was a heated debate in parliament on the subject. Members spoke of the "enchanged nation." The Emperor visited his Netherland possessions and was particularly impressed with the petitions from Antwerp, begging for freedom of navigation. But the exigencies of international diplomacy were too powerful. Joseph's chief minister, Kaunitz, was opposed to the demands and the well-intentioned but impractical Emperor yielded, telling his loyal but disappointed subjects "to turn their minds elsewhere." "They were," so he informed the French ambassador at Brussels "mad on the subject of the Scheldt."

Bitterly disappointed the citizens of Antwerp discussed the advisability of independent action. Among them was one named Count de Proli head of an Italian family which had settled in Antwerp in the days of the close commercial connection between Italy and the Netherlands. In some way he enlisted the interests of Catherine II of Russia in the project. Catherine even fitted out two ships at Riga to force the

passage of the Scheldt. Antwerp perpared to give a royal welcome to the vessels but for some unknown reason orders to sail were not given.

Two years later the Emperor again pressed his demands for the free use of "his river." But the Dutch were obdurate. "My countrymen will not give up their hold on the Scheldt" the Dutch minister at Brussels informed the Emperor's representative. To the Emperors threat that he would send his flag down the river and regard firing on it as a cause for war, the Dutch replied by assembling a squadron at Flushing. The Pensionary declared in secret committee that, "the Republic ought to spend its last shilling rather than submit to so destructive and humiliating a measure as the opening of the Scheldt."

The Louis a vessel of Antwerp started on Oct. 6, 1785 to force a passage. She was fired on, seized and taken in to Flushing by the Dutch.

The Emperor had his *casus belli*. But French support on which he had counted was withdrawn because Vergennes did not wish to aid the English project. Left to himself and fearful of the outcome of a war, Joseph yielded. In the Treaty of Fontainbleau Nov. 10, 1785, he accepted the continuation of the barriers to the commerce of the Scheldt in return for ten million florins. Antwerp's birthright was again sold for "a mess" of potage.

Not till the spirit of the French Revolution was carried across the frontiers into other lands, was Antwerp freed and emancipated. The enthusiasm of the great days "of 1792 after Valmy carried the troops of the Republic into the Austrian Netherlands and on November 25, General Labourdonnaye proclaimed the Liberty of the Scheldt in a remarkable decree, which set up the doctrine of the freedom of rivers in terms worthy of our own day. "Rivers," it declared, "are the property of all the countries touched by their waters."

"A nation may not without injustice (to others) arrogate to itself the exclusive navigation of a river or prevent the people

who live in the interior of the country from enjoying the same advantages.

"Such a right is a survival of feudalism, or at least an odious monarchical institution which force alone has established and which weakness on the one hand and power on the other have caused to survive.

"As a result, this right can be revoked at any time despite existing treaties, nature not recognizing privileged peoples any more than it does privileged individuals, and the rights of man are inalienable."

By the Treaty of the Hague the opening of the Scheldt by the French advance was formally confirmed. But this first occupation of the French lasted only about a year when the Austrian forces again took possession and the old restrictive trade arragements obtained once more.

In 1795, however, after the victories of the troops of the French Republic under Pichegru, the French took possession again; this time for a period of nineteen years. Into the vicissitudes of this occupation there is no occasion to enter. The freedom of the navigation on the river was solemnly proclaimed in August, 1796. The shackles were at last struck off, and the doors to trade once more thrown open. On the 18th of April, 1796, the Swedish ship "Tuscany," followed by three brigs, anchored off Antwerp. By 1805 the number had risen to 2424. To French occupation during the Revolution, Antwerp owes the creation of a number of commercial institutions, like the Tribunal of Commerce and the Chamber of Commerce. But commerce had lost the habit of calling at Antwerp and even during most of this early period few ships entered.

With the advent of Napoleon a new spirit was infused into the situation. He saw the extraordinary opportunities at Antwerp for building up a great international commerce. Besides in his hands, it would rapidly develop into an effective base from which to carry on the war against England. It would be, as he aptly phrased it, "a pistol aimed at the heart of England." A large shipyard was created and shipbuilding was begun on an extensive scale. But in the war between

Napoleon and England, Antwerp commerce found itself between the upper and nether millstones. On the one side British Orders in Council and the blockade closed the port. On the other Napoleon's Continental System ruthlessly destroyed the reviving commerce of the city because as Napoleon aruged, if there is any commerce it must be tainted by English connivance and therefore illegal.

By the treaty of Paris after Napoleon's overthrow it was stipulated that Antwerp should cease to be a naval base. But the old restrictions at the mouth of the Scheldt were not again set up. Indeed, under the Restoration, and during the union of Belgium and Holland, Antwerp fared very well. It enjoyed with the Dutch ports the commerce of the Dutch East Indies and was given considerable powers of self-government, especially in the matter of control over its quays and docks.

With the separation of Belgium and Holland in 1830 the old dispute over the freedom of navigation on the Scheldt again arose. After a bitter controversy, the matter was finally settled against Antwerp. By the treaty of London, of April 19, 1839, a tonnage duty of one florin and 50 cents was laid by the Dutch on all vessels entering and leaving the Scheldt. It was a severe handicap to Belgian commerce but there was nothing to do but to accept the situation. By the law of June 8, 1839 the government officially recognized the toll, assumed the responsibility for the tax and provided for its payment. In the early sixties, however, it was found that the tolls were increasing so rapidly in amount—from 612,313 francs in 1840, to 2,921,631 frances in 1862—that the government approached Holland with a view to the redemption of the right of toll entirely. An agreement was reached between the two powers in the treaty signed at the Hague in 1862. By this treaty all tolls levied on the commerce of the Scheldt by the Dutch were abolished for a money payment of 17,141,640 florins.. The navigation of the Scheldt was at last free and the fetters which jealous rivals had forged for Antwerp in the 17th century were struck off. The results soon appeared in a

great revival of her commerce which increased steadily with every decade till in the year before the war its tonnage actually surpassed that of the largest ports of the world.

Antwerp's Port and Growing Commerce

Located at the head of deep water navigation on the deep Scheldt, Antwerp's geographical position is as we have seen unusually favorable for the growth of a large international trade. The river at this point is sufficiently large so that with the aid of modern improvements it can afford excellent harbor and docking facilities to the largest vessels. The city and port authorities spared no effort in affording the most up-to-date means of docking, loading and unloading. They acted with implicit faith in the theory that harbor development on modern lines is immediately followed by increased shipping and that new trade and merchandize is sure to be attracted by shipping opportunities.

The Chicago Harbor Commission after returning from Europe in 1908 said in its report:

"The total wharfage of Antwerp is: Of riverside quays, 3½ miles, which can accommodate about 40 vessels at a time; and of docks, 11 miles, accommodating a very large number of boats of all sizes, from the canal barges and Rhine boats to the largest ocean vessels.

"There are on the average about 250 ocean-going vessels in port at a time, and several hundred smaller boats. Nowhere else among the score of great ports visited, save at Hamburg, was there evident so much activity in shipping.

"There is most excellent service in sheds and cranes. The sheds are about 360 × 195 feet, and sheds and tracks are so arranged that each shed with its trackage is a unit. The area of floor space in sheds is over 75 acres. Almost all of the sheds are of the one-story type. As a rule they stand well back from the edge of the quay with from one to three railway tracks in front, making it convenient to handle the freight from the rail to the ship direct. The sheds are made of steel with flat tar and gravel roofs, and walls of corrugated steel, which in the latest construction make use of an American invention, rolling up out of the way like a roll-top desk. The sheds along the city front have the roof made into a broad promenade overlooking the river and the shipping, a very pleasant feature, and one much appreciated by the people. The floors of all sheds

are of Belgian block, and the drays drive everywhere through them as required.

"In the newer installation the three railway tracks and the front of the shed are served by the finest cranes yet devised. These cranes have a single rail of track on the edge of the quay, and rise high above the cars on the three railway tracks and reach across them to the roof of the shed where the other track rail is placed. The railway tracks are so placed and arranged that service at front, middle and rear of the shed can be given without interference with trackage of any other shed. Out-freight accumulates in the shed on the quay side of the middle track, in-freight on the far side from the quay. The handling of freight is most expeditiously done; the service is very efficient.

"In warehouses the city is again far ahead of most other ports. The city owns six great buildings of absolutely fireproofs construction. Across the street from the main quay and sheds on the river front, four of these buildings stand in an impressive row. They are four stories high, of ferro-concrete, faced with cream-colored repressed brick, and have much architectural merit. They are separated from each other by stone-paved courts of generous width for fire protection. They are really beautiful buildings, and they offer as clean and neat an exterior as a series of art galleries. Railway tracks run on the ground level along the mid-line of the series, to serve them all. Freight elevators serve all floors; the rooms are separated from each other by concrete walls and entrance to any room is by the elevator or by a concrete balcony on the outside of the building. Nowhere else is there such absolute security provided for goods in storage. These warehouses are rented by the month, the rental varying from two cents per square foot on the ground floor to four mills per square foot on the top floor."

But magnificent as these arrangements were in 1908 when the Commission made its visit to north European ports, they have since been very much improved in connection with the new Harbor Extension projects.

Writing to his government in 1906 of the extensive improvements in harbor and shipping facilities at Antwerp, Sir Cecil Hertslet, the able British Consul at Antwerp said: "When the whole scheme is carried out the superficial area of the port of Antwerp will be quadrupled, and the port will be larger than any other now in existence.

Equally solicitous and intelligent has been the care of the government and the local authorities in the matter of affording facilities for the transport of goods to and from the interior. There are more railways to the square mile in Belgium than in

any other part of the continent. With an area of only 11,372 square miles it had in 1910, 1268 miles of double track and 1410 miles of single track railways. Besides the trunk lines, there are very many little branch roads. Every section, every town, indeed almost every village is directly reached by the railroads.

The same is true of the canals and water communications. Before the War there were about 1500 kilometres of canals and streams used for transport service. All are carefully articulated with the waterways of the French and German hinterland on the one hand, and definitely focused on Belgium's great seaport on the other. As with the railroads, so with the canals practically every village is reached. Boats of from 200 to 300 tons penetrate to the remotest corners of the little kingdom carrying goods direct from Antwerp without transshipment. All artificial obstacles intervening are thus removed. Water transport is very much used in Belgium; a little more than two thirds of the trade from the interior of Belgium comes by water.

The great industrial and mining region of northern and eastern France, so ruthlessly ravished by the Germans, represents, as is well known, nearly 90 per cent. of French iron, over 50 per cent. of French coal, and for this reason also, more than 75 per cent. of her industrial output. Antwerp is a natural port for the overseas commerce of this French region even more so than for the Rhine. That French commerce at Antwerp has lagged behind is due to political and artificial, rather than to natural causes.

Supported by so rich a tributary territory the commerce of Antwerp and of Belgium has developed beyond all proportion to the size of the little state. *In 1910 it was a rival for fifth place among the nations of the world, with a foreign trade of nearly 2500 million dollars in value.* In the past this phenomenal trade depended largely on the needs of Belgium's industrious and thrifty millions, but an increasing commerce in recent years with the more distant French and German hinterland reveals the possibilities of much larger expansion in the future.

The tonnage entering the port from 1850 to the year before the War shows a growth from 200,000 to over 14,000,000 tons. The steps in this development appear in the following table:

Tonnage entered at Antwerp, 1850–1913 (1)

Year	*Tons*
1850	200,000
1860	425,000
1870	1,100,000
1880	2,600,000
1890	4,500,000
1900	6,700,000
1910	12,600,000
1913	14,100,000

"From fifth rank in 1870 the port (Antwerp) has risen to second in all the world in 1906, with 19,662,000 net register tons entered and cleared; and in the last decade her rate of increase has been most rapid of all." (*Chicago Harbor Commission Report*, p.116.)

It should be noted, however, that in making comparison of Belgian tonnage statistics with those of other countries that the former are somewhat inflated and a deduction of about 15 per cent. should be made on Belgian official returns. This is due to the fact that space usually not counted for cargoes or passengers is included in the Belgian report on the net tonnage of all vessels. Furthermore, Antwerp, as is well known, is a port of call rather than a home port for a very large proportion of her shipping. Vessels come to the city, but they take on or unload only a portion of their cargoes. The tonnage statistics therefore correctly show the movements of the ships but not of the merchandise. Thus in 1909 the ship tonnage that entered the port was 11,907,689 as against the actual merchandise unloaded of 7,380,000, tons.

The following table of actual and percentage increase of net tonnage entering leading European ports for the periods from 1870 to 1900, and from 1900 to 1912, affords striking evidence on the growing importance of Antwerp's commerce before the war:

Port	1870 to 1900		1900 to 1912	
	In 1000 Register Tons	In per cent. of 1870 Figures	In 1000 Register Tons	In per cent. of 1870 Figures
Antwerp	4708	478	6001	105
Hamburg	6434	401	5330	69
London	5492	134	3405	35
Liverpool	2585	76	5808	97
Rotterdam	4944	482	5578	93
Bremen—Bremerhaven	1839	281	1744	70
Havre	930	77	1456	68
Amsterdam	1102	308	786	54

The figures speak for themselves. With Rotterdam, Antwerp leads by a wide margin in percentage of increase for the earlier period. For the second period Antwerp is the only port whose increase is more than 100 per cent.

Antwerp Coveted by Germans

We have seen how trade rivalry and international jealousies seriously interfered with the development of Antwerp. Indeed, the more intensely the nationalism of its neighbors developed, the more Antwerp became the object of their jealousy and cupidity. In the fifteenth and sixteenth centuries Antwerp became the first sea port of the world. But in those days the powerful nationalistic state was in its infancy. As Dutch nationalism developed it joined with other forces to crush and shackle the freedom of the city on the Scheldt. Then with the great outburst of democracy and nationalism of the Revolution, the possibilities of the Flemish port made it the coveted object of French ambitions. France seized it and was its master for two decades. That Antwerp did not progress by leaps and bounds as a part of Napoleon's Empire was due to English control of the sea and her careful blockade.

Early to recognize the importance of Antwerp, England

consistently opposed the domination of the Scheldt basin by any strong continental power. She contributed much to the destruction of the Spanish control in the sixteenth century, and in the Revolutionary and Napoleonic wars it was England that prevented the great designs of Napoleon with respect to Antwerp from being realized. Naturally, too, she favored the project of Belgian neutrality in 1830, and supported France in the policy which was formally agreed to by the five leading powers—Great Britain, France, Austria, Prussia and Russia in the treaty of 1839. By this agreement Belgium was "to be independent and perpetually neutral." For three quarters of a century the agreement was respected, then like so many other international arrangements for which geography seemed to have made no adequate provision, it was suddenly and ruthlessly swept aside.

It remained for the Germans to reassert the claims of an aggressive pre-war nationalism, of economic necessity, etc., against the equitable arrangement for neutrality and independence made in 1839, and as every body now knows, solemnly, renewed and reaffirmed at the time of the Franco-Prussian War in 1870.

Totally oblivious during earlier centuries to any claims on Antwerp, the Germans began, soon after their great industrial and commercial expansion led them into the overseas trade, to cast longing eyes at the port. Its location with respect to the great industrial area of Westphalia and of the Rhine Valley as a whole suggested the idea, discussed below, that it formed a shorter and natural outlet to the trade routes of the world. Teachers and writers of geography and commerce vied with historians and military men in pointing out the advantages and desirability of attaching Antwerp to the Empire in a commercial union or Zollverien. If obstacles that had to be recognized blocked political union, nothing, it was urged, must be allowed to prevent economic affiliation. And in accordance with this policy economic penetration with a view to ultimate control became a fixed part of the German nationalistic and imperialistic program long before the present war.

Thus the very first sentence of Dr. Wiedenfeld's pamphlet on "Antwerpen im Weltverkehr und Welthandel," published in 1915, declares; (p.l): "Antwerp—an entirely unique example of the international business life of modern times—plays a role of such striking importance in the foreign exchange of German products that, whatever its political status may become, economically, at least, it must be counted among the German ports."

Long before the War, Von Treitschke urged the necessity of Antwerp becoming a part of Germany's economic system. Even before Treitschke, the fire-eating patriot Ernst Moritz Arndt demanded the natural frontiers from Dunkirk to Bale. These are only early and conspicuous examples of an ever increasing advocacy of the extension of German power to Antwerp.

During the War the demand for the incorporation and retention of Flanders with Antwerp was especially strong. Many voices were raised in this cause. Among them none more significantly than that of Von Bissing himself; the man whom the Kaiser entrusted with the civil administration of conquered Belgium, and who may therefore be taken as fairly representative of the dominant and ruling class of the Empire.

"When," he says, "we consider the importance of Belgium as the theatre of our armies' advance, and as territory which favors our further operations, both offensively and defensively, there can be no further doubt that a frontier which is quite falsely described as the line of the Meuse, and is to be protected by the fortresses of Liege and Namur, is quite inadequate . . . No, our frontier—in the interest also of our sea power—must be pushed forward to the sea."[1]

" . . . If we lost Antwerp we should lose not only the port, our influence, our railway rates, etc., but above all we should lose the *powerful influence which Antwerp possesses as a trade and money center*; especially in South America. All these forces would naturally be turned against us as soon as they were released." . . . "If only on account of the necessary bases for our fleet, and in order not to cut off Antwerp from the Belgian trade area, it is necessary to have the adjacent hinterland"

[1] General Von Bissing's Testament, page 18.

(page 21). "Belgium must be seized and held, as it now is, and as it must be in the future." "For years to come we must maintain the existing state of dictatorship."

Attention is called to the remarkable commercial opportunities afforded by Antwerp. Wiedenfeld, noted above, points out that in the course of a single generation from 1870 to 1900 the shipping of the port increased six times. And what is even more striking, in the course of only half that period the already large overseas trade was again doubled. No other city, he points out, shows so phenomenal a growth in commerce in the years before the war.

Further illustrations of this point are unnecessary. It will suffice to say that the extension of German power in Belgium to the extent at least of establishing economic control and domination formed a part of the program of German imperialists for the least generation. Even the common people were inoculated with the idea.

The military occupation of Belgium and northern France afforded the opportunity to develop a policy of political as well as economic control. To this double end the German administration in Belgium directed its policy during the four years of occupation with a relentless determination that balked at nothing. Thus Von Bissing declared, "The advantages which we have been able to enjoy during the present War to obtain from Belgian industry, by the removal of machinery, and so on, are as important as the disadvantages which our enemies have suffered through lack of this addition to their fighting strength." The administrative and legislative measures of the German administration in the conquered territory reveal only too clearly the progressive steps towards a realization of this policy. And in carrying it out much more shrewdness and cunning was displayed than those who see mainly the cruelty and barbarism of the occupation, realized.

The policy of separating the Flemish population from the Walloons or French speaking Belgians attracted widespread attention. The country was divided into two parts by administrative order in the spring of 1917. It divided

Flanders from *Wallonia*, following approximately the language frontier between the French and Flemish parts of Belgium.[1]

This represented a definite effort to dismember Belgium, in order to make the absorption of the northern portion easier. The hostility that the measure aroused in all parts of the conquered land, both Walloon and Flemish was clearly reflected in the fearless and vigorous protest of the City Council of Antwerp.

"We consider this measure pernicious to the existence of our country, favorable to our enemies, and in contradiction to all our traditions and our highest interests. Although Belgium has not unity of languages, she is not an arbitrary creation of diplomacy, without any historical basis . . .

"If Antwerp regards herself with pride as the city having the most Flemish feelings of any in the country, she is no less proud to be, as a harbor and as an artistic centre, one of the most powerful organs of the whole of Belgium, and to be the equal in patriotism of any other municipality. This patriotism includes in the bonds of the same cordial affection the whole country, as all our fellow-countrymen are ready to admit.

Examination of the German Claims. In the light of the right of peoples to determine their own political status, especially in regard to a people so progressive and enlightened as the Belgians, it is evident that Germany's aims could not be realized. Protests like that of the municipality of Antwerp just cited and the action of men like Frederic and Pirenne, who, though ardent supporters of the Flemish movement before the War, refused flatly even in the face of exile, to have any share in the Flemish University organized by the Germans at Ghent, revealed clearly the loyalty of the Flemish to the cause of a regenerated Belgium.

As to German claims from an economic and commercial point of view, certain facts appear from a study of Antwerp's development since 1870 that are of considerable significance. In the first place, Antwerp is not as has been so persistently proclaimed in Germany, and too readily accepted abroad, a natural outlet for the commerce of the Rhine. It is not a part

[1] Cp. C. H. Huberich und Alex Nicholspeyer,—Gesetzgebung, u.s.w., Hague, 1917.

of the Rhine basin but separated from it by a distinct physical barrier. Nor is the Antwerp-route to the sea from the Westphalian industrial area, as it is so generally thought to be, geographically or economically the shortest, The all-water route from Cologne to Antwerp, available before the War, was more than 100 kilometres longer than the all-Rhine route from Cologne to Rotterdam, the respective distances being 425 kilometers from Cologne to Antwerp, as against 310 kilometres to Rotterdam.

Besides, the water route to Antwerp is available only for boats of small tonnage, not at all for the large 3000 ton barges common to Rhine shipping. Insurance rates, too, are higher because of the risks in the canals among the comparatively open waters back of the islands from the lower Rhine to the East Scheldt. Nor can it be urged that the project for a series of canals affording more direct communication between the two points would help matters much. The plan that has been generally accepted as the most feasible, namely, the canal *via* Aix, although shorter, involves no less than forty one locks. This would increase the cost of transport by this route to such an extent that successful competition with the all-Rhine route would be impossible. There is therefore a sound geographical reason back of the fact pointed out above, that the great overseas commerce of Antwerp is not German, but essentially Belgian. Even the rapid increase of this trade in recent years is due to Belgian rather than German products, despite the fact that the German ships were getting more and more of it in the general competition for the carrying trade of the port. The fact that Belgium stands fifth among the nations of the world in commerce, and that practically all of this great stream of trade flows through Antwerp, is quite sufficient to account for the extraordinary progress.

Nor should it be overlooked that while French imports by way of Antwerp are small, due mainly to discriminating duties levied at the French frontier upon all overseas goods landed in a foreign port, the export trade *via* the Belgian port is very large. Reference to the official statistics of the British govern-

ment, shows not only a considerably larger import trade into Belgium from France than from Germany or Great Britain but also a more rapid increase for the years from 1898 to 1912. Thus:—

	1898,—	1912,—
Belgian imports from France	12,000,000 £	£ 36,000,000
Belgian imports from Germany	9,500,000 £	£ 28,000,000
Belgian imports from Great Britain,—	11,000,000 £	£ 20,000,000

Antwerp is the natural port for the Scheldt basin which runs back into France and is therefore intimately articulated with the great industrial area of north eastern France. This creates an economic relationship between France and Antwerp which even Germany cannot boast. Furthermore, it is evident that a removal of the discriminating duties imposed by France upon imports *via* Antwerp would very soon increase the flow of French commerce landward through Antwerp to a stream quite as strong as that of Germany's.

In the matter of shipping, statistics seem to favor German ascendancy in recent years. But here, too, appearances are deceptive. Antwerp has been a port of call for the great ocean lines of the German companies, and as a consequence, tonnage under the German flag entered at Antwerp was as has been shown above, much more inflated than the British. The French because of governmental restrictions was almost negligible. British shipping at Antwerp was represented by a very large number of vessels of small tonnage of the tramp steamer variety, but whose trade was very real and substantial. Indeed, there was reason for the statement of a local commercial paper in Antwerp to the effect that German shipping increased the Belgium national statistics, while British shipping increased Belgium's national revenue.

On the other hand, it is only fair to say that German trade was gaining steadily. And since it was a trade so largely in the hands of Germany's most powerful commercial corporations,

like the Hamburg American and the North German Lloyd Companies, it is readily seen that it would have a decided advantage over its rivals in the matter of securing shipping and port advantages. The pressure of these powerful organizations, intelligently backed by an imperialistic government that knew what it wanted, very naturally came to be a dominating influence in the management of the port.

As far back as 1906 Sir Cecil Hertslet, the British Consul General reported:

> "The general geographical position of Antwerp is such that it is in the most advantageous situation for the export of goods from Germany and the whole hinterland of central and eastern Europe. A great part of the manufactured goods shipped from Antwerp is the product of German manufactories, and it is natural that such goods, which are conveyed to Antwerp for export by means of the numerous canals connecting Germany with Belgium, should be shipped on board vessels of the nationality of the manufacturers of the goods. There are, for instance, lines of steamers running from Antwerp to India of both British and German nationality, but the latter secure a considerable portion, if not the greater part, of the cargoes.

War and Reconstruction

What took place in Belgium during the four years of war and German occupation is a story of destruction and exploitation unparalled in history. The material losses alone, directly attributable to the enemy, according to the Belgian War Commission for the Estimation of Damages amounts, to over 7½ billions of dollars. In one of Mr. Hoover's reports it is stated that between 35 and 40 of Belgiums 50 steel furnaces were destroyed. Machinery and equipment of the textile and other mills were systematically commandeered and carried into Germany according to a well developed plan by Germany's foremost industrial magnate, Dr. Rattenau. Cattle and horses were requisitioned along with regular cash levies. The latter amounted to a charge of $144 million annually. Antwerp contributed a yearly quota of $10 million. And to these exactions came the forced labor deportations, and the

deterioration of the productive capacity of the Belgian workman which it is impossible to estimate, but which must be reckoned in billions. The great trade of Antwerp was, of course, entirely destroyed.

In the face of such staggering losses a prompt revival of Belgian industry and trade was impossible. The productive powers of the country having been paralysed for four years long and patient care will be necessary to restore them to their former capacity and activity.

Following in the wake of the first enthusiasm after victory and the armistice, came a wave of gloom and depression. The Germans had gone but the normal life of the pre-war days was gone too. To the heavy toll in human lives was added the destruction wrought by the enemy in the devastated areas, the stricken cities and the ruined industries. Capital, credit and initiative in enterprise return slowly. Lacking these and the necessary raw materials Belgian industry with its wrecked plants could not get under way. Hence during the first month of 1919 Belgium could export to England only £597,000 in value while her imports from England during the same period amounted to £4,667,000.

Finally after long and, to the Belgians costly, hesitation the Peace Conference recognized in part at least the priority claims of Belgium. She was allowed 2½ billion francs to be paid by Germany by May of 1921, 40,000 head of cattle and 8 million tons of coal annually for 10 years along with regular cash levies. This furnished the necessary credit and encouragement. A domestic loan of 1 billion was subscribed for and a still larger loan obtained in the United States. Antwerp was selected by the British as the base for its army of occupation in Germany, and facilities for the importation of new products provided. The commerce of the past which was of course, entirely destroyed during the war is reviving. One of the most interesting development, appears in the inauguration of a purely Belgian overseas service known as the "Loyd Royal Belge" a whole fleet of ships having been built for Belgium during the war by Whitemarsh on the Clyde. On all sides the evidence of a

truly extraordinary revival of agriculture, industry, and trade is apparent. The crops for 1919 were good. The revival of industry for the first ten months of 1919 was remarkable; the output compared with the corresponding period of 1913 shows: coal mines, 94% normal; sugar refining, 100%; cotton spindles in operation, 75%; cotton looms, 60%; wool products, 75%; shoes, 70%; window glass, 34%; plate glass, 36%. Steel and iron industries recovered more slowly, only about 30% of the mills having resumed operations by November of 1919.

Belgium is not only "coming back," but doing so with increasing momentum. In no other country is the progress of economic reconstruction going on so rapidly and so efficiently. The people have turned to the heavy task with great zeal and energy, while wise leadership is laying its foundations broad and deep. Belgian industry and commerce are again becoming important factors in European trade, and it is a matter of sincere gratification to all who have the welfare of Belgium at heart—and that means everybody—that Antwerp is destined not only to regain her pre-war prosperity, but to attain that pre-eminence and leadership vouchsafed her by nature among the seaports of the European continent.

SOME TRIUMPHS OF MODERN CHEMISTRY

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During the past few years the influence of chemistry has been felt in so many phases of our life, giving rise to new, and a short time ago undreamed of, industries, improving and extending the old industries, giving new comforts in our homes, creating a new warfare, assisting the skill of the physician, that the interest of many intelligent people has been attracted to the science of chemistry. It is true that much of the popular interest in the subject is to be attributed to the applications of chemistry in the war. It may be well to point out that not many new discoveries were achieved in this period. The war chemistry was rather an application of facts, already known, to new purposes. The stress of war-time conditions is not conducive to research and discoveries. These flourish better in the tranquil atmosphere of peaceful times.

At the same time the chemist has felt it increasingly necessary to have the sympathetic and intelligent interest of the general public in his science, that men and women of high attainments may be induced to enroll themselves as students of chemistry and help to carry it to still higher levels; and that existing chemical knowledge may be helpful to as wide a circle as possible.

In view of these facts those who plan this series of lectures have asked me to state, as simply as possible, and avoiding technical language, what modern chemistry is, and to describe some of its methods and triumphs.

The fundamental concept of the chemist is the elements. They are the chemist's building stones. They are forms of matter which are not capable of further simplification. They number nearly ninety. Every compound has been made by

combining two or more of these elements and every known substance in the universe can be resolved into these elements. They fall into two groups: the metals, and the non-metals. Among the former are many familiar substances: iron, lead, copper, gold and silver. And among the latter, sulphur and the gaseous elements, hydrogen, oxygen, nitrogen and chlorine are well-known. Some are found in nature in the free state. Others only occur in combination with other elements and require the chemist's art to set them free. The world would be a far less pleasant place to live in if this were not so. Phosphorus, a non-metal, must be kept under water, because it combines violently with the oxygen of the air and bursts into flame, producing a dense white cloud of smoke. Yet even such elements have important uses. Burning phosphorus proved to be the most effective smoke-screen in the war and one of the best ways to protect advancing infantry from hostile fire.

Let us turn our attention to some of the rarer members of the family. The metal tungsten has been known for about 150 years. It was found in a few rare minerals and the preparation of its compounds in a pure state was a most difficult process. A little of the metal itself, a dark gray powder, had been made in scientific laboratories. Twenty years ago it was still a chemical curiosity. Then it was found that the addition of tungsten to steel produced a remarkable result. Tools made of tungsten steel could be heated white hot without losing their cutting edge. Castings and armor plate could be hardened to an incredible degree. Our enormous production of war materials of every description was in no small degree dependent upon this metal. In 1918 more than 8,000,000 pounds were used in the steel industry alone. Other uses followed. At first the metal was known as a powder. Its melting point is so high that it cannot be fused and cast. By molding the powder into a bar heating at the temperature of the electric furnace in an atmosphere of hydrogen, rolling down the bar and repeating the process many times, a very satisfactory bar or sheet could be produced, and this could be drawn out into fine wire. This discovery cleared

the way for the tungsten filiment, which on account of its durability and efficiency is universally used wherever the electric current is employed as the source of illumination. Small bars of tungsten are daily contributing to the pleasure of thousands in the form of phonograph needles.

The history of tungsten has been repeated, at least in part, with a number of rare metals. Vanadium, molybdenum and uranium might be mentioned. First comes the purely scientific study in the laboratory. The discovery of practical uses follows, often after many years. Then new sources of the material are sought and found and in a few years, a scientific curiosity becomes an indispensable factor in our civilization.

In the case of other elements we find a different state of affairs. The metal calcium, in the form of compounds, occurs in enormous quantities. The metal itself may be obtained without great difficulty, but almost no uses are known for it. The same is largely true of magnesium, extremely abundant, but only used in small amounts for flash-lights and in a few alloys. Glucinum, a beautiful white and very light metal is by no means rare, but is only used as a gem in the combination known as the beryl. Here, then, is a great field for research, with the possibility of large returns to the investigator, if he needs that incentive; that is, in the discovery of applications for plentiful, but now useless, elements.

The discovery of uses for an element does not always produce fortunate results for the chemist. He has always admired the metal platinum for its beauty and its usefulness. It gave him crucibles which stand corrosive reagents even at high temperatures. Its permanence under all conditions introduced an accuracy into his work which was not attainable with apparatus of other materials. While always costly a few years ago even chemical students were able to own at least one platinum crucible and a wire or two. But two, almost simultaneous disasters, have almost swept away this invaluable material. The Bolsheviks have closed the platinum mines in the Urals and cut off the supply at the source. The beauty of the metal as a setting for diamonds has been discovered and

most of the available supply has fallen into the hands of the jewelers. An active search is being made for new sources of supply and has resulted in the discovery of several localities in the United States and Canada where production has been begun.

The rare earths represent an interesting family of metals. There are about fifteen of them, and while they resemble aluminium they have certain interesting properties of their own. They were found in a few very scarce minerals, always occur together in the same mineral, and cling together so tenaciously that it required about a hundred years for chemists to learn how to take them apart; and even yet the process is a most intricate and time-consuming operation. About thirty years ago it was found that the oxide of cerium, the principal member of the rare earths, mixed with oxide of thorium produced a most agreeable light when heated in a gas flame. This discovery created the Welsbach Mantle industry and gave a new lease of life to gas lighting. New sources of the rare earths were sought and found, but only a little of the cerium and none of the other dozen or more rare earths were used in making the mantles. Consequently thousands of tons of these costly materials accumulated and no use for them was known. In 1903 Welsbach took some of those residues, converted them into chlorides and by allowing the electric current to pass through them deposited the metals themselves on an iron wire which acted as the negative pole. On scratching this lump of metal with a knife a shower of sparks was produced. On investigating this unexpected phenomenon it turned out that an alloy had been formed between the iron wire and the cerium metals, and that this new alloy was the source of the sparking effect. Thus another new rare element industry came into existence—the manufacture of pyrophoric alloys, of firestones, and a legion of automatic gas-lighters, cigarette lighters, and similar devices have appeared on the market. Pure cerium is never used, but a mixture of the rare earth metals alloyed with about 30 per cent of iron. Small pieces of the alloy fly off when rubbed, become heated to the

ignition point, and burn brilliantly in the oxygen of the air. In Europe during the war when matches were both scarce and poor, the firestones were a most useful substitute. It would be unsafe to forecast the future of this industry.

One more representative of the family of rare elements is a gas called helium. This element was discovered in minute quantity in the atmosphere a quarter of a century ago. Many tons of liquid air were distilled in order to obtain a trifling amount of the new element. As it had been previously observed in the sun by means of the spectroscope, it was appropriately named helium. This element has two properties which might make it useful. Next to hydrogen it was the lightest known gas, and it is extremely inert, refusing to combine with any other element under any conditions whatever. No compounds of helium are known. Now, hydrogen is the best gas with which to fill balloons on account of its lightness, but even the mightiest dirigible is exposed to the constant danger of the hydrogen exploding as the result of ignition from a chance spark from electrical apparatus, from static electricity or in warfare from an incendiary bullet fired from a hostile airplane. As soon as the hydrogen takes fire a dreadful conflagration ensues and the only hope for the balloonist lies in a prompt use of a parachute. A substitution of helium for hydrogen would give almost as great lifting power and all danger from fire would be removed. In a word, a balloon in the air would be as safe as a ship on the sea.

With the object of obtaining a supply of the gas for filling dirigibles, American chemists began a search for new sources of this element during 1918, and discovered that large quantities of it were escaping from the earth, mixed with natural gas, in several localities in our western states. Means were found to collect and separate and store the helium at a low cost and we may be sure that it will play an important part in the next war.

The chemist represents the elements by symbols. The elements by combination form compounds and the chemist represents these compounds by formulas. You must dismiss

from your mind the idea that there is anything occult or mysterious about these formulas. They are merely a kind of shorthand in which the chemist states his results with the greatest possible brevity. One of the greatest triumphs of modern chemistry is the perfectly logical and rigorous reasoning by which the composition of thousands of substances has been worked out and represented by formulas. The object of chemistry is the study of the transformation of substances. These formulas tell the chemist the exact composition of the substance in question, so that by merely looking at the formula he can often foretell the properties of the compound, how it can be made, and what other substances can be obtained from it. Chemistry is a difficult subject, because there is an enormous amount of detail, and its study taxes the memory, requires reasoning powers of no mean order and a high development of a scientific imagination. In these days there is much discussion as to which subjects should and which need not have a place in the educational curriculum. The contention between cultural and vocational studies is unending. Those who teach chemistry feel no doubts about the place of their own subject, either now or in the future. No educational system can neglect a subject which requires of every one who studies it seriously the powers I have enumerated above and which at the same time is intimately connected with every phase of human welfare. I do not hesitate to promise that if some of you will discover a moral chemistry that will remove greed and selfishness, the chemist will undertake to make the world a very comfortable place to live in.

The elements are composed of atoms and each atom of a given element resembles exactly every other atom of that element. These particles are so small that a row of 50,000,000 atoms would be about one inch long. According to modern views the atom is not a small hard unchangeable particle, but a complex aggregation which may be compared to the solar system in complexity and configuration. The nucleus of the atom corresponds to the sun, scharged with positive electricity. The electrons revolving around the central nucleus represent

the planets. They are negatively charged, and as the positive charge on the nucleus is equal to the sum of the negative charges on the electrons, the atom as a whole is neutral. The nucleus and electrons are relatively as far from each other as the sun and planets. There would be room in a single atom for about 10,000,000 billion electrons, but as the atom of uranium, which has the greatest number of electrons, only contains 92 it is evident that atomic space, like planetary space, is not overcrowded. These atomic systems are in rapid motion, and there would be enough energy in a few pounds of uranium atoms to make all our energy from coal and oil and water power seem as nothing. But all this energy is securely locked up within the atom. Some of the heavier atoms are unstable and break down into simpler systems. The uranium atom is notably unstable. After giving several intermediate products the well-known radium is reached. In spite of the scarcity of this element it is almost universally used to illuminate the dials of watches and various recording instruments. Chemistry has again made one of the rarest substances available to everyone. The radium atoms are constantly undergoing a further break-down. At intervals atoms of helium are ejected with a velocity of 18,000 miles per second and along with them smaller particles, the electrons, which travel almost as rapidly as light, that is, 189,000 miles per second. Now the modern views on the structure of the atom have been largely based on a study of the decomposition of the radio-active atoms. These atoms are storehouses of incalculable quantities of energy. The question that naturally suggests itself is whether we shall ever find a way to harness and utilize this energy. As yet we know no way to approach this problem. Its solution would solve all our power problems. No one would have to do any more work.

The chemist divides his compounds into two classes: the organic, which contain the element carbon; and the inorganic, which do not contain the carbon as a principal constituent. Let us look into the production of an inorganic compound which will show us modern synthetic chemistry on its highest

plane of achievement. Nitric acid is the compound I have selected. This acid is an essential to our civilization. In the form of its sodium salt it restores nitrogen to the soil, and enormously increases the fertility of the ground. The dye industry is dependent upon nitric acid, and all modern explosives require it for their manufacture. Hitherto, sodium nitrate was being imported from Chile and nitric acid made from it by heating with sulphuric acid in retorts. The nitrate deposits are large but are being exhausted. A war with a power which controls the sea would place us in an awkward predicament. If Germany had been dependent on Chile for nitric acid the war would have ended in six months. Now nitric acid can be made from some very common substances. The atmosphere furnishes the raw material for the first method. The air is a mixture of oxygen and nitrogen. In one form of apparatus the air is passed through a powerful electric spark. The spark is surrounded by a magnet so as to spread it out like a fan and present as large a surface as possible. The nitrogen burns in the oxygen of the air with a great flame and produces nitric oxide. The nitric oxide in contact with more air forms nitrogen dioxide, the familiar brown fumes of the laboratory; and when this is dissolved in water and more air drawn through the solution, nitric acid is formed. This process can only be carried out commercially where water-power is available to generate the electric current.

The second process does not require the electric current. The first step is the formation of ammonia, a compound of nitrogen and hydrogen. While a simple compound it has only been within the last few years that the difficulties attendant on its synthesis have been overcome. Nitrogen is obtained by liquefying air and allowing the oxygen to boil off. Hydrogen is made by passing the electric current through water, or in other ways. The two gases are mixed and after being subjected to a pressure of 200 atmospheres are passed through a hot tube containing the metal uranium. The uranium is itself unchanged but causes the nitrogen and hydrogen to unite to form ammonia. It is known as a catalyst. A catalyst

is something which speeds up a chemical change but is unaltered itself. We know little about the way in which catalysts act. They have an important place in many chemical reactions. The ammonia is mixed with air and passed over heated platinum gauze, another catalyst. It burns with the formation of oxides of nitrogen which are converted into nitric acid as above. This process was discovered by Haber, a German chemist. If it is true that Germany depended on this method for nitric acid and consequently for her munitions, then the Haber process has probably affected the history of the human race more than any other single chemical discovery. Haber has not been without his reward. The Scandinavians have just conferred on him the Nobel Prize for Chemistry.

Let us note some of the products of another common substance. A lump of bituminous coal. It is placed in a retort of iron or fire-clay and heated until no further change occurs. The coal is not in contact with air during the process, so that it does not burn but undergoes an entirely different kind of change known as destructive distillation. There are three principal products: the coke, which remains in the retort; a gas, used for illumination and fuel; and a heavy liquid known as coal tar.

The coke has long been used as a fuel and is indispensable in the reduction of iron ore for the steel industry. I have in mind now some other syntheses that can be effected with it. When mixed with limestone and heated in the electric furnace, the carbon of the coke and the calcium in the limestone unite to form a greyish stone-like substance, calcium carbide. When this is dropped in water the gas acetylene is evolved, most useful as an illuminant and when mixed with oxygen producing an extremely hot flame, which will cut through an iron plate as a saw cuts through wood. Acetylene does not dissolve in water, but if we call in a catalyst, that is, dissolve a little mercury salt in water and add acid to it, the acetylene will combine with the water, forming acetaldehyde. The acetaldehyde is no very important substance in itself, but if its vapor is mixed with hydrogen and passed over finely divided nickel, a catalyst,

alcohol results. This is identical with the alcohol made by the fermentation of sugar. In spite of recent legislation it must be remembered that alcohol is a most useful and important compound. To mention only a few of its applications, it is solvent for shellac, in the making of ether and chloroform which are valuable solvents as well as anæsthetics; the dye industry requires enormous amounts of alcohol; and it is an essential in the manufacture of collodion, celluloid, and the modern explosives. It burns with a hot smokeless flame, and seems almost certain to undergo an important development as a fuel and illuminant. When alcohol is mixed with ether and a little guncotton dissolved in it, it sets to a jellylike solid. This "solid alcohol" may then be burned in any noncombustible container. The alcohol of which I have been speaking is ethyl alcohol and is not to be confused with the methyl alcohol or wood spirits which has been the cause of many unfortunate accidents within the past few months. The cause of the difference in the physiological action of the two alcohols is easily understood. Ethyl alcohol when taken into the human body is rapidly changed to carbon dioxide and water, both normally present in the body and harmless. Methyl alcohol is gradually converted into formic acid and possibly formaldehyde. The brain, and other organs, are attacked and blindness and death follow. The detection of the presence of these alcohols when together and especially in the liquid containing flavoring substances, is a problem that should be entrusted only to the expert analyst.

Just a few more facts about alcohol. It may readily be changed into acetic acid, again using a catalyst. Acetic acid combined with lime forms calcium acetate, and when this is heated acetone results. Acetone is a colorless liquid of a rather agreeable odor and another valuable solvent. Many volumes of acetylene dissolve in it under pressure and when the pressure is released the acetylene escapes and may be used for lighting and welding. The solution of acetylene and acetone may be safely stored and shipped.

Lastly, acetylene and acetone may be combined chemically

and we have the substance isoprene, whose chief interest lies in the fact that in contact with a catalyst, the metal sodium, it changes into rubber. Rubber from acetone is more than a laboratory experiment. It served the Germans well in the war and may become a competitor of the natural product.

The coal tar may claim our attention for a few moments. It is distilled from immense retorts which occupy an entire building. The products that come over at different temperatures are collected separately. When a moderate heat is applied, oils like benzol and toluol are obtained; then as the heat is increased, phenol (carbolic acid), naphthalene, anthracene, and heavy lubricating oils, while pitch-like substances remain behind in the stills which are used in making black varnishes and in making roofs and dust-free roads.

Let us follow the career of benzol. It is a compound of carbon and hydrogen, six atoms of each in the molecule. These atoms are joined together to form a ring. This type of ring structure plays an important part in many organic substances, especially among the dyes. The benzol is placed in a tank and a mixture of nitric and sulphuric acids run in in a fine stream. This is the famous nitration process which enters into the making of the modern explosives as well as dyes. After some hours the benzol is converted into nitro benzol. It is used as a perfume. In the next step the nitro benzol is heated with scrap iron and hydrochloric acid. Hydrogen is evolved and the nitro benzol converted into aniline. This is the starting point in the making of numerous dyes and pharmaceutical products. By a similar process naphthalene and other products of the coal distillation are turned into coloring compounds. The details of their manufacture must be left to the student of chemistry. To mention just a few classes of dye stuffs, the azo dyes in which two nitrogen atoms join together several benzol nuclei, yellows orange scarlet, black, and blue shades, the triphenyl methane colors, the beautiful golden auramine, magenta, aniline blue, crystal violet, indigo, and alizarin noted for fastness as well as beauty. Let us remember that these beautiful and useful com-

pounds are obtained from an evil-smelling liquid. Let us also remember that they represent the unremitting toil of hundreds of highly trained chemists working for more than half a century. It is also well to remember that these dye factories in time of war may be converted into efficient munition plants in about a month. That is why the American chemist is so insistent that the growing and already highly creditable industry in this country shall be given adequate encouragement and protection, and shall not be allowed to slip out of our hands, thereby depriving us of a most valuable ally in time of peace and war.

A few words about the making of modern explosives will enable you to grasp the truth of the remark about the interrelation of the dye industry and the making of munitions. The modern military explosives are divided into two classes, the propellants used to eject the projectile from the gun, and the high explosives which furnish the bursting charge for the shell. The principal explosives are nitroglycerine, nitrocellulose, picric acid, trinitrotoluol, tetranitro aniline, nitro starch, ammonium nitrate, and mercury fulminate as detonator. The process of making these bodies is identical with that used in making nitro benzol; a mixture of nitric and concentrated sulphuric acids is run into a tank containing glycerine or cellulose made from cotton, until the required number of nitro groups have been introduced. The nitroglycerine is a liquid. When absorbed in sawdust or porous earth, it is known as dynamite, a commercial explosive. It may also be absorbed in gun-cotton, forming a kind of double explosive which has been largely used for military purposes by the British under the name of cordite. Nitrocellulose and the mixture of it with nitroglycerine are the safest and most efficient propellants.

The remaining explosives are used in the bursting charges, picric acid, made by nitrating carbolic acid or phenol. It is a yellow solid, formerly used as a dye. From toluol, a close relative of benzol, trinitrotoluol is obtained and used under the name TNT. It is usually regarded as the safest high explosive to handle. Nitro starch results when the nitrating acids act

on common starch. It is a treacherous substance, but was used to fill hand grenades. When properly made and free from impurities, the above explosives have a considerable degree of stability. A stick of guncotton may be held in the hand, lighted at one end and allowed to burn, without danger. The explosion is brought about by subjecting them to a vibration of a peculiar kind. This vibration is best induced by the explosion of a small quantity of mercuryfulminate. It is a curious fact that some of these explosives may be heated and even hammered with impunity, and yet when a minute amount of this unstable compound of mercury is placed in contact with them and set off by percussion, the vibration set up is passed along from molecule to molecule with every-increasing rapidity and the molecules themselves are torn to pieces. The tremendous expansive force of the explosion is due to the fact that when the molecules disintegrate the products of the decomposition are in large degree gases which occupy a volume relatively many times greater than the original molecule in the compound. An additional factor is the high temperature produced by the reaction, which causes a further expansion of the gases.

The explosive industry is by no means limited in its usefulness to periods of war. Engineering operations, such as tunneling, canals, and bridge building, require large quantities of explosives. Further, the explosive manufacturer can and does easily adapt his plant to the production of a constantly increasing list of useful articles. By stopping the nitrating process at an earlier stage the deadly guncotton is exchanged for celluloid, the stability of which is further increased by the addition of camphor. The cost of imported camphor has forced the American chemist to perfect its synthesis on a commercial scale, another most important achievement in organic chemistry.

For every process that has been mentioned ten others of equal value and interest might be described. For every experiment or discovery which has turned out to have a commercial value, a thousand have been made which have never

made a cent for any one. On the contrary, they have consumed a vast amount of the time of numberless highly skilled workers, and often involved the use of extremely expensive materials. About 75 years ago a chemist added ammonia to a solution of a cobalt salt (cobalt is a metal similar to nickel). At the end of several weeks he happened to notice the dish containing the solution of cobalt and ammonia and found it contained beautiful purple crystals. His interest was sufficiently aroused to investigate the matter, and the discovery of an entirely new class of compounds resulted. Bodies in which from one to six molecules of ammonia are directly attached to the atom of metal. It was soon found that other metals possessed the same property of uniting with molecules of ammonia. Chromium, platinum and other members of the platinum family, all formed similar compounds. Further, the ammonia can be replaced in part or wholly by water, by chlorine and other elements and groups of elements. The compounds are nearly all well crystallized and show beautiful colors, so that an exhibit of them might be well mistaken for an exhibit of dye stuffs. If all the workers in this field could be gathered into one room it would make a goodly company. This class of compounds has been subjected to a most searching study, and as a result we know far more about them than about most other classes of inorganic compounds. One man received the Nobel Prize in 1912 for his work in this field, and that amounts to about $40,000, but no one else ever made any money from them, or found any uses for them. What shall we say to work of this kind? A student who was working on these cobalt compounds once complained to his professor that he had spent many months working on one derivative and had paid for a large amount of costly material out of his own pocket, and had almost nothing to show for it. The professor regarded him with a look of pity, and said, "My friend, time and money play no part in this laboratory." This is the spirit in which work of this kind must be undertaken: to advance the line of knowledge just a bit, to clear up an obscure reaction or two, or to prepare a few new compounds

without troubling themselves about their uses, is all that the great majority of patient investigators can hope to do; and it is just this army of humble workers scattered throughout the scientific laboratories of the world that must be encouraged and maintained. Their work is inconspicuous, but vital to progress. They furnish the data, the facts, in a word the building material which lead to the great generalizations and the epoch-making discoveries by the master minds of chemical science.

THE EVOLUTION OF GARDEN FLOWERS AND FRUITS IN THE PAST CENTURY

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A century may be a long or a short span in human history. While the days and the years of it may all be mathematically the same, a hundred years for man is long or short just as he makes it. The united human activities of such a period may be uninteresting, uneventful and sluggishly progressive. Then a century moves past with slow and dreary beat, as did the 13th and the 17th of our bimillenium. Or again stirring events, notable discoveries, new inventions, successful explorations, may be crowded into years that seem from their teeming activities, to race past alike before the ocular and the mental vision. Such was the past century, that had no previous equal in human history. Such unquestionably will be the present, that before its close shall have eclipsed all others in progressive accomplishment.

Our desire now is to travel backward in thought, and to estimate, so far as possible, the advances made in man's knowledge and utilization of new flowers and fruits through the past century. The endeavor is an eminently appropriate one when we remember that this is the centennial year of Herbert Spencer's birth, and that within two months we shall have reached his centennial birthday. Though he could be called neither a botanist nor a horticulturist, his far-reaching and increasingly accepted views on the phenomena of life, have earned for him our profoundest gratitude and thanks.

But such a retrospect, as is now proposed, could nowhere better be made than in this our city, for a hundred years ago it was the leading center in America for study of plant and animal life; as it was the home of eminent scientists, horticulturists,

and plant-breeders. By their efforts were founded the University in 1740, the Philadelphia Society for Promoting Agriculture in 1785, the American Philosophical Society in 1806, the Academy of Natural Sciences in 1812, and the Pennsylvania Horticultural Society in 1827. The continued existence of these institutions, as well as its justly celebrated nurseries and private gardens of to-day, are proof that the century-old aspiration is being worthily perpetuated.

In our attempt to estimate aright the progress made in the evolution of new flowers and fruits, we may be aided by a little publication that is now before me, but which is of extreme rarity. Its title page reads: "Periodical Catalogue of Fruit and Ornamental Trees and Shrubs, Greenhouse Plants, etc., cultivated and for sale at Bartram's Botanic Garden, Kingsessing, near Gray's Ferry, Four miles from Philadelphia, Robert Carr, Proprietor. Russell and Martien, Printers, 1828."

We all honor the name and memory of John and William Bartram, the former of whom in 1728 "established the first Botanic Garden in America" and has well been described as "one of the most illustrious, and by far the most picturesque of the early botanists and horticulturists of America, and his simple, wholesome, powerful personality presents a picture that is altogether amiable." His sons, William and John, perpetuated the establishment as a nursery-garden—for alas no city or state aid was forthcoming—and from it the first printed catalogue seems to have been issued in 1801, or 27 years earlier than that now before us. In this early work it is said that "these extensive gardens became the Seminary of American Vegetables, from whence they were distributed to Europe and other regions of the civilized world. They may with propriety and truth be called 'The Botanical Academy of Pennsylvania,' since, being near Philadelphia, the Professors of Botany, Chemistry, and Materia Medica, attended by their youthful train of pupils, annually assemble here during the Floral season."

In his later years, and up to the time of his death in 1823, the venerable form of William might have been seen moving

about amongst his garden treasures, superintending the migration of his greenhouse plants on to the open terraces before the homestead in spring time, and the return of them to the long heavy semi-building, semi-greenhouse nearby, that sheltered them through the winter months, happy meanwhile in the thought that his Journal of Wanderings in the Southern States had been republished in London, as well as translated into French, Dutch and German, a rare distinction for an American book of those days.

The surroundings, the day-thoughts, and the activities of many of us often pass into night dreams. And those night dreams at times seem to condense events into a few minutes, that have taken days for waking accomplishment. Scenes and personalities also may be conjured up that we have known only from description or illustration. So, it need not be regarded as passing strange if a Philadelphia plant-lover of to-day—saturated with the plant lore of the past hundred years—were to walk in dreamland with Friend William Bartram, and in the act were to hold pleasant converse on the flowers and fruits of 1820, as compared with those of our own time.

Listen then to the story of the dream, which resolved itself into four excursions, that the two kindred spirits Botanicus and Friend William took amid Philadelphia environs. The first of these four excursions seemed to unfold on a sparkling morning in late April, when Botanicus looked in on Friend William at the revered Bartram Homestead. His aim was to guide the latter on a springtime visit to a well known Philadelphia Garden.

Scarcely had they emerged from the old and historic domain, when the venerable companion was puzzled by two deep cuttings, that were traversed—far as the eye could see—by shining iron cords. Botanicus tried to explain that along these cords rushed engines, each hauling village-loads of humanity at the rate of 40 miles an hour. The startled look on the usually placid face of Friend William had scarcely faded, when Darby Road was reached and an electric car rushed past. Our Friend stood amazed and timorously looked

around. Instead of the fields, the woodlands, the mudroads and fences of his remembered days were solid rows of houses on every hand, smooth paved highways with distant vistas and great cars moving along them as if propelled by unseen power. Instead of replying to his astonished queries, Botanicus drew his attention to long rows of light greenhouses that he proposed they should look in on. Friend William viewed them critically though suspiciously, but agreed to enter. The sight lit up his countenance, as house after house was traversed. He remembered the hardy though simple Carnations, Roses and Snapdragons of Kingsessing Botanic Garden, and now looked on tall stately stalks that were crowned by large, rich and symmetric blooms of varied and attractive hue. He marvelled when told of the culture adopted, of the extensive sales effected, of the prices paid, and of the many homes that were adorned in winter and spring time by them. But he could not refrain from asking where the prim and exact Camellia blooms were, that he and his father had grown, with much care, in their rather gloomy plant house, for adornment of the lady guests at the annual Assembly Ball. When told that fashion had ruled them out as being frail and scentless, a look of resignation glanced from his eyes.

Again emerging into the open, Botanicus induced his venerable companion to board successively two electric cars that speedily bore them to Horticultural Hall. The latter made admiring exclamations, as many home gardens were passed, that showed mounds of white, pink and purple Magnolia blooms borne by spreading trees. All of these he was told were native to Japan, and had only reached Philadelphia about 1830, when they soon became favorites and proved to be as hardy as they were handsome. He recalled with interest the successful discovery by his father in the mountains of the Central Eastern States, and the subsequent distribution by him, of the native Magnolias with giant leaves and pure white flowers, that now find place in European collections.

As the paved walks of Fairmount Park were traversed, and the imposing outline of Horticultural Hall glistened through

the trees, Friend William greatly admired the scene on every side. As part of, and now surrounded by, what had become a city of a million and a half population, the park yet suggested to him rural quiet combined with gardening skill. Almost simultaneously brilliant expanses of yellow, white and scarlet tulips caught his eye in one direction, crimson patches of the dwarf Azalea amœna from Japan appeared in another direction, and rich borders of multicolored pansies gave quieter effect, in yet another. With the enthusiasm almost of boyhood, he hurried from one group to another, and then proposed many questions. He recalled the tulipomania of three centuries before, when single bulbs were gambled about up to a price of even $2000. He spoke of Maddocks' varied collection of tulips in 1792 that included 665 named varieties. He appreciated even the powerful action of environal agencies, when he quoted Philip Miller's views of 1807 as to the origin of the numerous types of tulip of that time. Says he; "all that can be done by art, is to shift the roots every year into fresh earth of different mixtures, and into a different situation, by which method I have had very good success."

Botanicus at once exclaimed—"You were good evolutionists then a hundred years ago, when you recognized that changed surroundings produced changed results." William seemed puzzled, but kept his peace. His companion on the other hand started to expatiate on how the tricolored "Johnny-jump-ups," or wild pansies of William's childhood, had been exposed to varied soils, had been carefully selected by seed as improved strains then appeared, had been skilfully crossed with each other during the past half century to force new combinations of color, size and shape, till from such beds as they then stood by, he boldly asserted that at least 250 distinct varieties could be secured. Then said William slowly: "changing and varied surroundings that will break the type, skilled selection of the best that appear, and crossing of these with each other to secure still more rapid variations seem to be your compound secret that has given such wonderful results." In triumphant tone Botanicus exclaimed;"Precisely so, and in like manner

have natural agencies been operating more slowly for millions of years to effect like results."

Conversing thus, a curve round the shrubberies revealed abundant yellow sprays of the pendulous Forsythia, that again was hailed as a welcome migrant from China and Japan that arrived about 1850, and had since flourished and multiplied along with its near ally, the upright species. "Here too," said Botanicus as he pointed to a row of nearby bushes, "is a more recently introduced native of the same countries that has become an ever increasing favorite during the past forty years." And stooping down Friend William noted a few lingering scarlet fruits amid the abundant pendent blooms and unfolding leafbuds of the Japanese Barberry.

As they descended between masses of shrubbery into the valley below with its chain of lakes, William's arm was suddenly grasped by his companion, who pointed lakeward as he declaimed:

"I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host of golden daffodils,
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.

Continuous as the stars that shine
And twinkle on the milky way
They stretched in never-ending line
Along the margin of a bay:
Ten thousand saw I at a glance
Tossing their heads in sprightly dance."

"Splendid" said Friend William. "Yes, truly splendid! for Wordsworth was a naturalist born, who proclaimed environment and ecology even though he did not know the words." As they gazed in delight, the aged plant-lover recalled that beds of the yellow and the Poets Narcissus grew at Kingsessing in his day. But he admired the manner by which Art had imitated Nature, and even excelled in effect. He expressed surprise also that so many varieties should now

exist. Thereupon his guide informed him how a few flower enthusiasts of the past 50 years had invaded the fertile valleys and moist hillsides of Spain, the Pyrenees, Morocco, the Tyrol, Asia Minor, and even distant China, in search of new species or natural hybrids between these. Then skillfully crossing and recrossing the captured gems, they had succeeded in hopelessly mixing the species, but in proving also that Dame Nature is a "mixer" of high degree.

Friend William seemed now to feel that his brain carried as much of "new impressions" as he could well assimilate for some time, while his silvery locks and furrowed countenance reminded his companion that age has its limits. So they retraced steps and reached the Bartram home safely, in spite of the thousand cars that rushed wildly around them on the way.

As the two parted for a season, an early day in flowery June was agreed on for a second meeting in that dreamland vision, and the weeks between, as in all dream records, telescoped themselves apparently into a few minutes. Meanwhile the floral procession of the year seemed to pass in kaleidoscopic variety, and with increasing richness of effect.

Genial weather, warm breezes, and blue skies of June were around them as they set out to visit a private garden "along the main line." Friend William had reluctantly consented that the visit should resolve itself into "an auto ride." As he seated himself in the luxurious car he could not refrain from contrasting it with the hickory buggy of his active days, that survived many joltings along the deep ruts of the mud roads. But soon the easy gliding motions and rapid adjustments of his new conveyance caused him to confess artlessly that the new was better than the old.

It was the time of roses and as they rolled along between rows of beautiful homes with surrounding gardens, his eye rapidly noted the beds and groupings of this Queen of Flowers that appeared on every side; or that clambered high as Dorothy Perkins and Crimson Rambler wreaths over porches, lattices and boundary fences. At length he exclaimed in

emphatic tones "We had roses—Burgundies and Maiden's Blush and Damask and Hardy Monthlies and White Musk and Provence and soft nestling Moss Roses whose petals peeped out from mossy sepals as if bashful of their own beauty—but our supplies were limited, and so was their culture. Now they are everywhere, and all can seemingly purchase and enjoy them." "Yes" replied Botanicus "the discovery of new roses and the wide cultivation of them within the past seventy-five years have effected a real revolution in horticulture. For within that time botanists and horticulturists have ransacked Siberia, China, Japan, India, Persia, Asia Minor, as well as the western half of our continent for novel species. Their hybridization also has proceeded actively for the past thirty years, so that most of those around us are complex hybrids, not true species."

William confessed that no such possibilities had ever occurred to the scientists or gardeners of his day. "True, true!" said Botanicus "it is usually correct in human affairs that 'the unexpected always happens,' "and to this William cautiously assented. But he also expressed great surprise that the world had been so diligently ransacked, and that communication had become so easy. "Surely" said he "if such results have been secured, the nations have ceased to fight each other, and peace, lasting peace, has come to earth." Botanicus looked steadily on his placid countenance for a moment, as with anxious longing words he replied: "No! the whole world is aflame now with the worst and meanest human passions, and though we now have 196,000 ministers or ambassadors of the Prince of Peace over this broad Commonwealth, they as well as their 750,000 colleagues in Europe have proved utterly impotent in preventing the international conflagration." William sighed out the words "Terrible, terrible" and bowed his head in deep thought.

"Yes" added his guide and companion "you rejoice at the myriad rose-blooms on every hand, whose origin, from parent-species, can be traced to the ends of the earth. Let me present another truthful statistic as to the activity of civilized man

who has called these roses into being. Were all the mangled dead of our recent war placed closely side by side, they would form a continuous line across the 3000 miles of this great continent. And were all the permanently wounded ones to be set in closely arranged chairs fronting the dead they would form a double row across the continent." William's hand went up in aghast attitude, while his thoughts harked back to the Napoleonic wars. Then in sad tones he queried whether man had become wiser through the century, as he evolved new and exquisite floral creations, and at the same time devised new and more destructive methods for killing his neighbors wholesale. The reply of Botanicus was that superman is still largely a savage animal, who conceals his acquisitive greed under such expressions as "love of fatherland," "patriotism," and "freedom of individual action."

Meanwhile their car had swept into the midst of spacious private grounds, and they stepped down amid a blaze of color that at first bewildered Friend William. Soon he recognized that he was surrounded by Azalea and Rhododendron flowers of every hue. "Here" exclaimed Botanicus in triumphant delight "America, Asia Minor, India and China have all been placed under tribute, and for you the story has special interest. A century and a half ago you and Father John sent the hardy mountain Rhododendron (R. maximum), the pink catawba species (R. catawbiense), the native pinxter-flower or Pink Azalea (Azalea nudiflora), the white scented swamp species (A. viscosa), and the celebrated flame Azalea of the Carolina Mountains (A. calendulacea) to Collinson and other enthusiastic plant-growers of England, who prized them greatly. Fifty years later a purple-flowered species was obtained by them from Asia Minor (R. ponticum) and not far distant a yellow sweet-scented Azalea was found, that possibly was the plant whose nectar poisoned Alexander's retreating army nearly two and a half millenia back.

"Skilled English gardeners crossed several of these with surprising results. But when the gorgeous crimson tree rhododendron (R. arboreum) of the Sikkim Himalayas, and the

yellow Azalea of Northern China were discovered these started mental pictures in the minds of some gardening idealists, that took form in time—as all idealists' pictures do—in the now celebrated Highclare Rhododendron, and the equally celebrated Highclare and Ghent Azaleas. Regarding the first of these Lindley wrote in 1831: 'The history of the creation of this superb plant deserves to be particularly described, as it not only shows how great the power of man is over Nature, but it holds out to us a prospect of the most gratifying kind in regard to the future gayness of our gardens.' Since then the hybridization of many species—and not least of the early Bartram exportations of Rhododendron and Azalea—has proceeded with such rapidity and success that the perplexing admixtures and the brilliant results have been equally pronounced, and are now around you."

Need we wonder that they lingered lovingly amid these old friends with new and transformed floral faces, or that William's queries were many.

But as they moved around amongst them an added attraction appeared in a nearby large bed of herbaceous plants. A glance caused Friend William to acclaim them as Columbines. But the size, the varied colors, the frequent long spurs of the flowers were arresting. Here again it was explained that from judicious blending of the purple Swiss species, of our native eastern red one, of the yellow, the blue and the white Californian varieties with long spurs, the diversified progeny now before them had been secured. "Wonderful, truly wonderful!" was our sage friend's only comment.

They had been joined by the estate gardener, who now conducted them with evident pride to an iris and rock garden, that at once imitated nature and greatly excelled her in condensed variety and display. Huge cushions of alpine pinks, crimson geraniums, yellow and white sedums, blue forget-me-nots, purple bell-flowers, scarlet catch-fly, white evergreen candytuft, yellow and scarlet poppies from the Welsh and Swiss Hills or from far Turkestan, formed a blended and harmonious contrast of striking effect, amongst the rocks

and huge boulders that they almost covered. "How natural, and yet how artistic," exclaimed William.

Then the yellow European and the native blue irids by a dripping runnel, the hybrid Florentine, the Spanish, Syrian, Siberian and Persian species on drier soil, but above all the massed display in a marshy bed of the gorgeous Japanese Irids that were wholly new to our dreamland visitor, excited his highest admiration.

But, having now entered the kitchen garden, he was puzzled by some young plants recently set out. "Ah," said the gardener, "those were not grown in gardens of a century ago, but now yield two of our commonest summer fruits. We call them tomatoes and egg plants. Curiously enough too I hope to invite you to partake of forced ones that were reared in those nearby hot frames." Stepping over to these and lifting a sash he raised a pot. Thereafter he turned to Friend William and said: "You grew strawberries, but not in pots like these, nor nearly of the size." Then as the scarlet tomatoes and dark purple egg fruits were shown, our visitor confessed that the world had surely moved forward within a century.

But the midday hour had now arrived, and even though only dreamland spirits, lunch in the head gardener's home seemed a most satisfying and welcome event to all three. There the history of the potatoes, the white sugar, the tea of the table, that were all rare, or unknown, in Friend William's day, had to be recited as meanwhile they enjoyed the cooked egg plant, the sliced tomatoes, and the huge juicy strawberries of the nearby forcing frames.

In resuming their garden peregrinations, our friend of ancient days was much pleased with the tender green shoots of a new climber to him, that closely crept up over the walls of the hospitable home. He noted its general resemblance to the native Virginia climber, and so was pleased when told that it was the next of kin to it, was native to Japan and interior China, had been introduced within the past fifty years, but now was the universal favorite as a summer wall decorator.

The frequent mention of China and Japan aroused his

curiosity, for in his day they were regarded as "the hermit kingdoms." So when informed that these countries had yielded more abundant and more beautiful additions to the plant world than any other equal area of the North Temperate Zone, including the many varieties of Weigela, the climbing purple and white Wistarias, the ornamental flowering almonds, the finest spiraeas as well as Deutzias, and many other now favorite types, he could only repeat the old saw: "Wonders will never cease." Scarcely had they stepped out into the garden when his attention was drawn to a spreading tree whose unfolding leaves were almost hid by abundant pyramids of blue-purple blooms. His two companions almost simultaneously declared that here was added proof of their contention. For the purple Paulownia tree, that was introduced in 1840, is the most striking addition of the century to our tree flora. Botanicus also added that nearly all the rich plant novelties received during the past fifteen years were from interior China, which gradually was yielding up its plant secrets and treasures.

They had now reached a splendid suite of glasshouses that excited Friend William's unbounded encomiums. "We never even dreamed of such, nor of the wealth that they must represent" was his remark. But ushered into the first of them, that was a stove house, he stood speechless and admired. Pandani from the East Indian and Pacific Isles, gorgeous Gloxinias and flaming Flamingo flowers from Brazil, were there, while Begonias with leaves and blooms that rivalled each other had been assembled from the four quarters of the tropics. But all were instantly forgot, and a boyish enthusiasm burst forth, when the dreamland guest espied some hanging baskets of genuine East Indian Pitcher plants. "At length I have seen the rival—nay even I will freely say the decided superior—to my trumpets or pitcher plants of the Southern States. We read of these and longed for them, but never saw them in our day" was his glowing tribute.

When Botanicus described to him, in sober language, how abundant insects—up even to cockroaches—were caught,

drowned, digested by a secreted pitcher juice, and the dissolved products were then absorbed by the interior pitcher wall, he slowly muttered, as if in reverie: "Truth is stranger than fiction."

Thereafter they were ushered into a sub-tropical orchid house, that still showed wealth of bloom for that period of the year. And as the endless variety of floral form, color, size and scent were recognized, Botanicus gradually unfolded the story of their adaptations to insect visitors, their cross pollination by these visitors, as cool juice in some cases or nectar in others was being sipped, their maturation later within each capsule of minute seeds that might range from a few thousand to as many as three millions, and which in their extreme lightness might then be disseminated for hundreds of miles from the parent plant.

But further Botanicus expatiated on the marked capacity they showed for crossing of different species with each other, or even for the blending into one progeny of the minutest details of three distinct generic parents, that had been intercrossed successively. So, aided by the garden superior, he pointed to many hybrids, some of which had been discovered in the wild state, but most of which had been reared artificially, and which all conformed to such characteristics. "New, all new, as the century has unfolded, and I begin to realize how little we knew," was William's reflection.

"But" said Botanicus "we are more ignorant than you were. For botanical science has opened up such long vistas for future discovery, experiment, and investigation, that we realize more and more painfully how little we can learn even in the longest life time."

Though greatly tempted to make frequent halts the aged visitor now declared that the rest of home was necessary. So with heartfelt thanks to the garden keeper, the two were soon wheeling their way to Kingsessing, and on arrival there agreed that early August should bring them together again as dreamland wanderers.

It seemed a mild and salubrious day, amid the many

previous hot dogdays, when Friend William and Botanicus again greeted each other. Drifting fleecy clouds floated across the blue morning sky as they again stepped into a spacious autocar. Then William was told that they were heading for some private gardens at Chestnut Hill, whose owner always welcomed plant lovers. The smoothly paved streets and never-ending trolley lines, the avenues and terraces of luxurious homes, the attractive gardens that surrounded the homes, and the wires that seemed often to enter the roofs or sides of these all started comment and inquiry.

Friend William had already learned somewhat regarding the telephone, and had also noted the sudden advent of light along the street lamps at eventide. But as the convenience and utility of both modern discoveries were explained to him in detail, such seemed to produce in him a sense of deep regard and even veneration for modern human discovery. He asked therefore why it was that mankind still continued to invent horrible instruments for the destruction of fellowmen, while achieving such wonderful and beneficent cooperative inventions. To this Botanicus replied that the whole history of animal life in the world proved that constructive "Beauty" and the destructive "Beast" had ever struggled for the higher place, but in the ultimate issue the former always prevailed. At this moment their car swept in between spacious gate portals to grounds that presented a noble combination of foliage and floral effect. "See around us ample proof of my contention" said Botanicus. "Constructive Beauty has always prevailed and will prevail."

In company of the owner they now inspected the plant groupings, and nearest to them were two great beds of hybrid cannas. William recalled that they gathered and grew as greenhouse plants the rather attractive native yellow species from Florida, as well as three others from South America. But these now before them were truly "new combinations and creations." Botanicus quickly explained how some French nurserymen, from 1863 on to 1890, crossed the old small-flowered species with each other, till they secured a race of

dwarf hybrids of striking beauty. Then simultaneously in Italy and in the Philadelphia neighborhood marked improvement was effected on these, alike in size and richness of foliage as in shape and beauty of flower.

Some extensive and adjoining beds puzzled Friend William even more. For the margin of each was fringed by a herbaceous mass of multicolored bloom, which encircled spreading plants with rounded flowers of varied hue. When Botanicus spoke of the former as Petunias, William shook his head in ignorance; when he called the latter Dahlias, William's face lit up with surprised interest. They were described as migrants from Mexico or the Argentine, which, after a journey to Europe about a century ago, had landed in North America some seventy to ninety years back. Both also were viewed as outstanding examples of man's cultural ingenuity in crossing two species of each kind, and thus of upsetting the hereditary stability that through long ages they had acquired in their native haunts. Then by combined crossing, high culture and selection of the resulting variants, the twentieth century gardener had evolved products that might well be called "new species." From the Golden Horn of the Orient to the Golden Gate of the Occident also, these triumphs of garden Science had been widely dispersed. "Verily a romance of Science," observed the wealthy owner.

Friend William's outlook was now directed to a sheet of water that sparkled in the summer sun, but whose surface also was overspread by "water lily pads" that were overtopped by showy flowers of every tint. White lilies were there from New Jersey and Central Europe, yellow ones from South Florida and—as hybrids—from France, great crimson blooms recalled the still lagoons of India, others of pale and of deep blue tint carried the mind back to the Sacred Lotos of Egypt and to "King Solomon's Mines" of South Africa, while large purple flowers of "Nymphaea Pennsylvania" told of active hybridization by scientists of that University to which Friend William had been chosen as botanical professor nearly a century and a half before.

He recalled how he and his father John had converted a low marshy spot that was near the Bald cypress, of the old Botanic Garden, into a genuine lily pond where the yellow Nelumbo and the white Nymphæa luxuriated near each other. So on being told that lily ponds were now frequent adornments of American gardens, he modestly suggested that possibly in the Bartram Botanic Garden originated the first western lily pond, even if it could not compare in sumptuous architectural accessories with those of Egypt and India of three millenia before.

He would fain have lingered too amongst the novel orchid-like flowers of the hybrid Gladioli, whose primitive purple ancestor he had advertised fully a century before. But the owner pressed his two guests to visit his adjoining orchard, in which evidently he took great delight.

Here, Friend William seemed more at home, though not a little puzzled. For, while he now easily recognized rows of fruiting egg plants and tomatoes, as of the previous excursion, the Apple, Pear, Plum and Peach trees were much like those of his active days, though all bore fruits that for size, color and rich abundance were strangely different, though eminently attractive. "You have been 'evolving' your fruit trees also" he said "whatever that word 'evolving' may stand for in your dictionary." His two companions laughed heartily, but also agreed that he was right. For they said regarding the pears alone that on comparison of the eighty-one varieties listed in the Kingsessing catalogue of 1828, only five or six—like Jargonelle, Seckel, Louise Bonne, Summer Beurre and Swan's Egg survived pure, alongside the 150 good named pears and 500 poor ones of modern catalogues. So the Bartlett, Giffard, Kieffer, Le Conte, Madeleine, Sterling, Tyson and Winter Nelis were all products of the past century, that were either evolved and selected varieties, or as with Kieffer and Le Conte were hybrids between the original European pear and the Chinese Sand Pear.

Friend William was greatly pleased to learn that even fruit-bearing species could be crossed, and can yield hybrids

whose fruits are of value, as with Kieffer in the Northern and Le Conte in the Southern States. For he had formed the impression that while flowers might by crossing be greatly improved, fruits were useless or would not set. On the contrary, Botanicus expressed the view that production of hybrid fruits was truly in its infancy, and that before the close of this century one of its scientific triumphs will be the successful formation of many such, as successors to the hybrid strawberries, apples and pears of recent years.

The beauty and great variety of apples deeply impressed our visitor also, who compared the abundant, but rather small and unattractive fruits of the 88 listed Kingsessing varieties with the rosy-cheeked McIntosh Red and York Imperial, the huge attractive Wine Sap or Delicious, and the sweet Russet or the Golden Pippin.

To secure the greatest amount of cider was the 18th century aim, to produce a beautiful sweet and wholesome table apple had been that of the 19th, and highest success has attended the latter effort.

But the opulent possessor of the orchard inquired of William if in his day destructive diseases caused wide-spread havoc amongst flowers and fruits. Such, he learned, seemed to have been little known. "How different then from now" he said, and pointing successively in four directions added, "there is a great old chestnut tree from which my young folks gathered many bushels of fruit, but now it is slain by the chestnut blight; on that rising ground is a tree of sickly hue that proclaims coming death from Peach Yellows; yonder are a few brown twigs on a Bartlett tree that tell of advancing Pear blight; here are some apples over which we fought a fierce but successful battle with the despicable and hardly visible San Jose scale." To this Botanicus added that nowhere in his travels had he ever viewed a sadder prospect than about 60 miles of West Florida land that he looked out on during a railroad journey of fifteen years before. Dead and dying pear trees, deserted or neglected homes with shutters swinging in the wind, fields filled with weeds, fences broken down, told

alike of blighted plants, and sadly blighted human hopes and happiness over that wide area of pear orchards.

So struggle for existence and survival of the fittest seemed everywhere to rule as a law amongst plants and at least amongst many animals, according to the garden proprietor. But Botanicus quickly added that one other and greater organic law of cooperation was silently but surely acting amongst higher animals, and not least amongst human-kind. This developed and insured a far nobler type that in time absorbed or replaced the greedy competitors and heartless destroyers.

The summer warmth of the day seemed now to tire the venerable plant-lover, but the welcome shade of the owner's home, the refreshing breezes started by an electric fan that interested the guest greatly, and a sumptuous lunch that all three evidently enjoyed, gave renewed vigor. So when their host suggested that before parting they should inspect the adjoining home conservatory the two visitors gladly agreed.

As they entered, the moist "smelly" air of the interior seemed pleasing to Friend William, but the combined scenery of his new environment completely arrested for a time his advance. Covering one side of the roof above his head was a mingled mass of green leaves and purple flower-bracts of the Brazilian Bougainvillea; on the other side was an equally effective expanse of Clerodendron from river sides of old Calabar. Beyond the former were large flaunting yellow blooms of the noble Allamanda from Brazil, while opposite it appeared the pale crimson hues of the climbing Lettsomia from Java. Palms with foliage of many shapes and sizes, Travellers Trees from Madagascar with strict two-rowed leaves, parti-colored Crotons and graceful tree ferns from Brazil, the Hawaiian Isles and the Indies all spread upward as if attracted by the brilliant climbers overhead, while clambering stems of Monsteras and Philodendrons bore giant leaves of entire or perforate aspect. "New, all new, and beyond the most sanguine dreams of possible realization" exclaimed William, while over his entertainer's face spread a look of pleased satisfaction.

The leave-takings seemed hearty, and the homeward journey full of reminiscent discussion till the Bartram house came in sight. Then both agreed that a day in mid September should end their excursions into the floral dreamland of a century.

A shimmery autumnal day had come round in the latter part of a September that had proved mild and agreeable in vision continuity. Friend William greeted Botanicus with quiet enthusiasm as the motor car of previous travels drew up by the old homestead. They were bound for a private garden about sixteen miles beyond the city, and "along the Main Line." Already prophetic autumnal tints were on the Red Maples and Sour Gums, while mellow fruits seemed abundant in wayside orchards.

As suburban home gardens were rapidly passed two arresting plants constantly recurred and often in adjacent company. The flaming sheets and lines of red color told of the Scarlet Sage, that reached Philadelphia indirectly from Brazil about 1830 and soon achieved deserved popularity. Its neighbor was the pink-white clustered Hydrangea from Japan. Mention of the latter name at once caused William to recall how his father had sent the native northern one to England almost two centuries before, how he had named the oak-leaved species from Florida, and had imported some of the varieties of the gay Japanese one, that is now a favorite with all. In turn Botanicus informed him that among the hundreds of new plant species imported in the past dozen years from interior China, and that promised great things, were some valuable Hydrangeas. This too was cited as another of the many proofs that the floras of the eastern states and of China-Japan were intimately related and clearly indicated common descent, in the past history of the earth.

Lighting up many stretches of shrubbery, or massed in separate beds, were tall graceful Composites whose flower-heads suggested to Friend William a close resemblance to miniature white and crimson Dahlias. Botanicus congratulated him for thus wisely connecting the Mexican Dahlias with

the Mexican Cosmos, and further observed that the two species of the latter reached the states between 1820 and 1896, but were now the two autumnal garden favorites, that bloomed on till frost nipped them.

As the car glided along the avenue that led upward to the home of their future entertainer, the great variety of trees that lined the walk on either side was taken note of. Nearly all of these had been made known to science during the century, and had been collected from the four quarters of the North Temperate Zone. But as they alit beside the palatial home, clambering wreaths of bright crimson blooms and tenuous leafy branches caused William to utter an exclamation of joy. "Truly the sight deserves your praise" said Botanicus "for here is the reward in using old friends after new and approved scientific fashion. For Slotter's hybrid Morning Glory is at once a tribute to the patient efforts of its originator of some six years ago, and is a beautifully blended union of the feather-leaved and the cordate-leaved species that were often grown in gardens during the past two hundred years, after their introduction from tropical America."

The proprietor, who had now joined them, led the way to the hardy garden, along the trellis walks of which many varieties of Clematis were trained, that were all proclaimed to be hybrids of the past half century. In their production a species from South East Europe, that had been grown for at least four centuries as the purple Bower Vine, when crossed with a lavender species of the past half century from China, or with other species from the Himalayas and Japan, had yielded the wealth of bloom that still lingered on from their blaze of summer beauty. And amongst them all Jackmann's Clematis was accorded first place.

Asters and hardy Chrysanthemums were an attractive autumnal showing that were familiar to Friend William as favorites of century-old days. But the proprietor asked him to withhold final judgment till the Japanese greenhouse forms had been seen.

Meanwhile they had entered under long grape trellises, the

umbrageous coverings of which, loaded with fruit-clusters of varied tint, called forth many opinions and questions. Memories of the old Bartram Garden, with its 118 named varieties of European wine grapes, its 24 varieties of imported table grapes, and its six native unimproved grapes, rose before Friend William's eye. The sight surrounding him now represented a bare century of progress in the selection, amelioration and hybridization of one of the above six, the purple Catawba or Foxgrape, though hybrids like Lindley and Agawam shown in the collection, were a blending of the ancient European with the American species, a true marriage of grape vines from the old world and the new, with happy and beneficial result. Friend William's closing remark to the whole discussion was: "If so much has been accomplished in the past century, what may we not expect in that now with us." To this his companions heartily agreed.

Ushered thereafter into three modern graperies with their large and luscious pendent fruit-masses, our visitor scarcely knew whether most to praise the light airy structures, their skillful mechanical adjustments, the successful cultural methods employed, or the evident results secured. But in brief words Botanicus recalled the fearful fight that had been waged, with the grape mildews and the Phylloxera insect in Europe, during the half century that had then closed, as proof that human skill and investigation can solve many difficult problems, even in plant diseases. "In truth" said he "in this one department, now called plant pathology, Botanical Science had achieved some of its greatest victories."

But the Japanese Chrysanthemums in an adjoining plant-house furnished the climax to the visit. For Friend William was puzzled to know whether most to praise the pompon, the incurved, the reflexed, or the softly plumose types, when all seemed to rival each other in size, beauty and original effect. The sight around him he was told was due to Robert Fortune's introduction from Japan in 1862, of the forerunners of the new race, that gave the needed stimulus to western growers and hybridizers that they have fully profited by.

Seated now at the hospitable board of the entertainer all three of the dreamland party engaged in animated discourse. Friend William declared he was much pleased that the gardeners had achieved so greatly in the evolution of new Azaleas, new Rhododendrons, new Roses, new Orchids, Irids, Apples, Pears, Dahlias, Morning Glories, "new everything in attractive flowers," as he laughingly condensed into a sentence his seething thoughts. Botanicus willingly assented to this, and acknowledged that botanists had too long looked askance on the splendid achievements of the garden breeders and hybridizers. For some at least of the botanists regretted much to see their dearly loved "true species" all jumbled together. But the very possibility of this and its recognition had given wider and truer views than had ever before been entertained regarding plant life. He recalled however that in the days of the Bartram activities the opening up of South Africa and Australia had greatly enriched Science as well as garden collections with "heath house" types, that in their beauty and novelty stimulated to further effort.

To this William agreed, at the same time adding that one great charm of the old gardens was their varied and successional assemblage of hardy perennial plants, that gave never failing interest to each garden possessor from late March to closing November. He congratulated his two entertainers that this feature had not only been retained, but much extended in character. "For I have noticed" said he "that your beautiful herbaceous borders contain many treasures that are novelties to me, while the appropriate massing of all of them tell of an artistic sense that we seldom exercised.

"So my benediction is, that humankind may advance to ever new triumphs in the evolution of flowers and fruits; that such efforts and achievements may aid in further conquering and truly civilizing the still savage side of man's being; that the greed and selfishness of his lower nature may before the century's close, become replaced by co-operative effort and social harmony the world over; and that then the world may become a great garden of beauties that both of you can explore

every nook of in your improved flying machines, and bring back vegetable treasures that you can experiment with and improve."

As the words fell from his lips Friend William faded from their view, the entire scene suddenly seemed to change, Botanicus mused alone, and rubbing his eyes he saw only some of the fair flowers and fruits that dreamland fancy had woven together into a picture of varied coloring but truthful detail. That picture we have attempted to put before you to-day.

THE WORK OF THE HEART[1]

By Alfred N. Richards,

Professor of Pharmacology

The subject which I am to present for your consideration is set down as the Work of the Heart. In the hour which is available to me, I can do no more than present superficially certain phases of the heart's activity and have therefore chosen one in which I have been particularly interested, viz.: the sequence of the heart's contractions.

Any such discussion of the heart's activity as this should, I think, begin with some statement, however brief, of the work and thought of that greatest of contributors to our understanding of the heart, William Harvey, an English physician of the seventeenth century. In 1628, he published the results of some years of study and experimentation in a little volume entitled "*De Motu Cordis et Sanguinis*" which was epoch-making in that for the first time a correct view of the function of the heart in relation to the movement of the blood in the vessels was set forth, together with ample evidence to support it. When one reads this account nearly three hundred years later, one is struck by the modernity of his views; in fact it is Harvey's teachings which we all learn in the

[1] This lecture was illustrated by moving pictures of the heart's action made by the Clinical Film Corporation of New York. The experiments which were photographed were made on completely anæsthetized animals in the Laboratory of Pharmacology of this University. The expense of the pictures was borne in large part by Mr. Walter E. Hering of Philadelphia, to whom grateful acknowledgment is made.

Lantern slides were also shown of the various structures which make up the cardiac mechanism. The expense of reproducing them has necessitated their omission from this volume. The imagination of the reader is invoked to supply this omission: Most of the standard text books of anatomy and physiology contain these or similar pictures.

instruction which we first get concerning the heart as the propelling centre of the circulation.

I wish at the outset to state as briefly as may be an outline of this conception of the heart which Harvey was first to demonstrate and which has not since required essential correction.

First let me with a few words and some pictures describe the organ which we are discussing.

The heart is a hollow muscular structure, which in the adult man weighs some 11 ounces. It encloses four chambers, the right and left auricles and the right and left ventricles.

Figure 1 shows the external aspect of the human heart and great vessels. The two great veins, inferior and superior vena cava, bring the blood from all parts of the body back to the right auricle, with which they are united. The right ventricle receives the blood from the right auricle and propels it via the great pulmonary arteries through the lungs; it leaves the lungs by the pulmonary veins and returns to the left auricle, not well shown in this picture, from whence it passes to the left ventricle, which in turn pumps it into the aorta and then to all parts of the body except the lungs.

In effect, though the heart seems to be a single structure, it consists in fact of two hearts, and it is strictly proper to speak of the "right heart" and "left heart." The right heart, consisting of right auricle and ventricle, receives the venous blood from the body and propels it through the lungs. The left heart receives blood from the lungs and propels it through the arteries of the body.

The structural independence of the two ventricles is illustrated by Figure 2 which shows the separation of the two ventricles. The left ventricle is the more symmetrical structure, the right more irregular in contour, and the cavities of the two are completely independent of each other.

I have already outlined the course which the blood takes through the beating heart. Those statements will be made clearer by Figure 3, which shows the difference between the tasks required of these two divisions. The lightly shaded parts of the drawing represent arteries, the deeply shaded

parts veins. The four chambers of the heart are represented in outline from left to right as follows: right auricle, right ventricle, left ventricle (numbered 1), left auricle. The venous blood of the body, received by the right auricle, passes into the right ventricle and is pumped by this through the pulmonary vessels (numbered 2). Here, in the lungs it is arterialized by loss of carbonic acid and accession of oxygen. It then reaches the left ventricle via the left auricle and by this is pumped through the rest of the body. The portion of the diagram numbered 3 represents the blood vessels of the head, neck and upper extremities; 4, the vessels of the spleen; 5, those of the stomach and intestines; 6, those of the kidney; 7, those of the trunk and lower limbs; 8, those of the liver.

The right heart then is the pump for the pulmonary circulation, the *lesser circulation;* the left for the rest of the body, the *greater circulation.*

The tasks which the two sides of the heart have to perform are unequal, not because the amounts of blood which each has to propel are different, for they are not, but because the resistance which the blood meets in flowing through the vessels of the lungs is vastly less than that which the blood meets when flowing through the vessels of the rest of the body. In a word the right heart pumps against low resistance, the left against high resistance; hence, greater energy requirements are demanded of the left than of the right heart. Corresponding with this difference in task is difference in structure.

Figure 4 shows a cross section through the muscle of the ventricles. A marked difference in thickness is seen. The muscle of the right ventricle is thin and to the touch is yielding; that of the left is thick, strong, and to the touch firm and resistant.

Implicit in what I have said, and understood I am sure by all, is the fact that the structures of the heart are such as to permit normally a flow of blood in one direction only, that is, in the right heart from great vein to right auricle, from right auricle to right ventricle, from right ventricle to the pulmonary artery; in the left heart, from pulmonary vein to left auricle, from left auricle to left ventricle; from left ventricle to aorta.

In normal health it seems wholly likely that no blood moves in the reverse direction. This movement, always in one direction, is secured by the presence of valves situated at the various gateways from one chamber to another, so perfect in their structure that they interpose no resistance to passage of blood in the forward direction but prevent completely any regurgitation in the reverse direction.

You will be interested I think in these pictures of the valves of the heart.

Figure 5 shows the valve between the left auricle and left ventricle (the mitral valve), the auricle and most of the ventricular muscle having been cut away. It shows the two leaflets of the valve, nearly as they would appear were the ventricle intact, full of blood and about to expel that blood into the aorta: *i.e.*, in such a position that blood could not flow backward into auricle. A valve serving a similar purpose exists between right auricle and right ventricle.

Figure 6 shows the pulmonary valves, closure of which prevents blood from flowing back into the right ventricle after it has been expelled by ventricular contraction. In this picture both the pulmonary artery and ventricle are shown as having been opened by a longitudinal cut, the walls spread apart. Pressure of fluid from upper side would distend the three cups of the valves and in their normal position in the intact aorta their edges approximate so perfectly that flow of fluid back is prevented. If fluid below the valves is subject to pressure greater than that existing in the artery the cups of the valves collapse and interpose no resistance to the flow of fluid into the aorta.

This valve is duplicated, practically, by another situated at the opening of the aorta from the left ventricle.

Starting with this knowledge which Harvey gave us, that the function of the heart is to receive the venous blood and force it via the right heart through the lungs and to receive oxygenated blood from the lungs and to propel it via the left heart through the body, and having a general understanding of the form of the structures concerned, I wish you now to see a representation of the heart in action. No picture can do justice

to the perfection of mystery which makes up the heart's movements; but you will, I think, understand what was in Harvey's thought when he wrote: "When I first gave my mind to vivisections, as a means of discovering the motions and uses of the heart, and sought to discover these from actual inspection and not from the writings of other, I found the task so truly arduous, so full of difficulties, that I was almost tempted to think, with Fracastorius, that the motion of the heart was only to be comprehended by God."

[Here a motion picture was shown of the contractions of the mammalian heart *in situ.*]

In this picture the superior vena cava is shown just before its entrance into the right auricle and the contracting parts which are most prominently seen are the right auricle and right ventricle.

This picture forms in reality the text of what I have arranged to attempt to bring before you this afternoon. Knowing something of the heart's structure, and knowing as we do the result of its movements, we may properly ask ourselves, what is the natural sequence of these movements so that the heart is effective as the pump of the circulation, and how is this sequence secured.

The answer to these questions has not been secured in the first instance by study exclusively of the mammalian heart. The rapidity of its motion makes it difficult if not impossible to distinguish what is contraction or *systole;* what is relaxation or *diastole.* Harvey wrote concerning this "For I could neither rightly perceive at first when the systole and when the diastole took place, nor when and where dilatation and contraction occurred, by reason of the rapidity of the motion, which in many animals is accomplished in the twinkling of an eye, coming and going like a flash of lightning; so that the systole presented itself to me now from this point, now from that; the diastole the same; and then everything was reversed, the motions occurring, as it seemed, variously and confusedly together."

It has been the study of the more deliberate movements of the more primitive and hence simpler hearts of cold blooded

animals which has given us the basis of our knowledge of the confusing motions which we have seen. I shall show in a moment a picture of the beating heart of the frog, a picture which is more instructive in that we are permitted to see the sequence of the contractions of the various parts of the heart. But first it is necessary to show and explain some differences in structure which exist between the frog's heart and the mammalian heart, differences which are vital to our understanding of the events which are concerning us. These differences are pictured in Figure 7.

As in the mammalian heart, so in the frog's heart there are two auricles, or receiving chambers, the right which receives venous blood from the whole body except the lungs, the left which receives the blood from the lungs. Unlike the mammalian heart, there is but one ventricle, and this has the task of propelling blood through both circulations, viz.; that of the lungs and that of the rest of the body. A more significant difference is to be found on the venous side of the heart. The great veins which return the venous blood to the heart do not, as in the mammal, join directly with the auricle. There are in the frog two vessels corresponding to the single superior vena cava of the mammal and one vessel which corresponds to the inferior vena cava in the mammal. These three vessels join to form a cavity, triangular in outline, its apex downward. This cavity is called the *sinus venosus*, or venous cistern. This *sinus venosus* opens into the right auricle and this in turn into the ventricle.

In brief, while we regard the mammalian heart as consisting of two forms of structure, viz.; auricle and ventricle, the frog's heart is to be regards as consisting of three, viz., sinus, auricle and ventricle.

[Here a motion picture of the living frog's heart was shown. The contracting auricles, ventricle and a portion of the sinus venosus were clearly visible.]

The picture is now shown. Here is the tip of the venous sinus, here the auricle, here the ventricle and here the aorta.

Note the rhythm of the three chambers: 1 2 3, 1 2 3, 1 2 3, and so on. Never do the three chambers beat simultaneously; always they contract in sequence and always in the same sequence; first sinus, then auricles, then ventricle. No pictures were shown of the valves in the frog's heart between the different chambers. Suffice it to say that such valves exist, one set between sinus and auricle, one between auricle and ventricle and one at the beginning of the aorta, which prevent flow backward. Hence the sequence which we have noted is precisely that which we can see to be best adapted for producing an onward movement of blood from vein to auricle, from auricle to ventricle and from ventricle to the arterial system. From this picture you will realize what is meant by "wave of contraction".—an expression which, applied to the frog heart, connotes the sequence upon which I am laying emphasis. The contraction begins at the sinus, then involves the auricles, finally the ventricle. It will be obvious too that any disturbance in this sequence will disturb the power of the heart to propel blood.

Having seen evidence of the order in which the various parts of the frog's heart contract and having learned the meaning of the term "wave of contraction," we are now in a position to ask ourselves how this sequence is brought about and what the intrinsic qualities of the heart structure are which insure this.

In answering this question, one experiment made nearly 70 years ago by the German physiologist Stannius stands out as that which has afforded the most productive clue. I had hoped to show an actual picture of this experiment in progress, but technical difficulties were too great.

One thing must be stated before describing the experiment; That is, that the presence of blood in the frog's heart is not necessary for its beating. One can remove the blood entirely from the animal and still the heart goes on contracting in normal fashion. This fact alone is sufficient to dispose of an ancient idea that the blood contained a substance or substances which caused the heart to beat.

The Stannius experiment, as developed by subsequent experimenters, is this: Tie a thread tightly about the frog's heart at the exact point of juncture of *sinus venosus* with the auricles. The sinus goes on contracting at its original rate; the auricles and ventricle stop beating for a time, but when they resume contractions it is seen that their rate is decidedly slower than that of the sinus. Now let a second thread be tied tightly about the heart at the juncture of auricles and ventricle; the contractions of the ventricle become more infrequent than those of the auricle. There is now no longer anything normal about the sequence of the heart's contractions. The sinus goes along at its original rate. The auricle contracts at a rate slower than and completely independent of that of sinus. The ventricle beats still more slowly and quite independently of either.

What our threads have done is to sever the continuity of structure of these three parts of the heart; muscle fibres are broken and this having been done we find that we have played havoc with the perfect relationships which normally exist between the contractions of the various parts. Now each part contracts at its own rate and the rate of each part is progressively slower, the further it is from the sinus; *i.e.*, auricle less than sinus, ventricle less than auricle.

The explanation of this phenomenon was not truly made out for some thirty years after the published description of this experiment. In giving the commonly accepted explanation of this experiment, let me state first that the muscle fibres of the heart possess what is called automatic rhythmicity, *i.e.*, the power of undergoing rhythmic contractions without any apparent external stimulation. If we cut from the heart of the frog a strip of muscle or a ring of muscle, and suspend it suitably in a moist atmosphere, or in a solution of salt, it will beat; *i.e.*, contract rhythmically; and if we compare this rhythmic power in different parts of the heart by suspending strips from each part of the heart, it can be shown that all possess it, but that it is most marked in the sinus strip; least in the ventricular. In a word the *highest rhythmicity*,

i.e., greatest capacity to contract spontaneously, exists in the sinus, the lowest in the ventricle; the auricle possesses it to an intermediate degree.

When we say that heart muscle is automatically rhythmic, we confess that we can't see why it contracts. The striated muscles which cause movement of the limbs are ordinarily completely quiescent unless and until they receive a stimulus from the outside, either directly applied to their fibres or transmitted to them by nerves. The heart muscle, however, while it is like skeletal muscle in that it does respond to mechanical or electrical stimulus from without, also appears to have the power of originating stimuli within itself—as a result we believe of the chemical processes which manifest its life.

It has long been known that when any muscle contracts, electrical changes occur in it. The active part of the muscle possesses a different electric potential from that of the resting part, so that if wires are led off from the two parts an electric current flows from active to resting part. If for example two muscles are taken, each with its attached nerve, the nerve of one laid across the other muscle, the nerve of the latter stimulated, both muscles contract. That means that the "current of action," as it is called, in one muscle is capable of acting as a stimulus to another whose nerve is placed so that it can be influenced by it. This experiment, not strictly apropos, is mentioned to illustrate how the contraction in one group of muscle fibres may induce a contraction in others which are closely adjacent to or continuous with them.

I have previously stated that the various parts of the frog's heart all possess independent or automatic rhythmicity, but that they possess it in unequal degrees. Strips from the sinus contract more rapidly than strips from the auricle; strips from auricle more rapidly than strips from ventricle. But in the intact heart all contract at the same rate—viz., that of the sinus. This is because the different parts of the frog heart form really one continuous muscular structure. The sinus is most contractile and is therefore the first part of the

heart to contract; its contraction stimulates the auricle and this in turn the more sluggishly rhythmic ventricle.

Now when a thread is tied between any two of the chambers of the frog's heart, normal continuity of structure is destroyed; and after the immediate effects of injury have passed off the part just beyond the thread, no longer receiving action current from its sinus neighbor, proceeds to obey the will of its own chemistry and so sets up an independent slower rate of contractions.

This interruption in continuity of muscular fibres of various parts of the heart is spoken of as interruption of conduction or heart block.

Much labor has been devoted to the study of the question whether conduction in the heart is a nervous or muscular affair. The implication in all that I have said is to the effect that it is muscular, and the weight of evidence appears to me to be very largely on the side of this view.

To summarize briefly, and while summarizing let me show a repetition of the previous motion picture. The beating frog's heart shows a sequence of contractions of its three parts which is ideally suited to propel blood in a forward direction from veins to arteries through the successive chambers, sinus, auricles, ventricle. It owes this sequence to two things: first, the fact that there is muscular continuity between the different parts and hence one part can be stimulated by contraction of another; second, to the fact that the automatic rhythmicity of the three parts diminishes as we pass from sinus to ventricle, and in consequence the whole heart takes its pace from the sinus.

The venous sinus in the frog's heart is the *pacemaker* of the whole heart.

I wish now to again consider the action of the mammalian heart and to show if possible the bearing of the facts just outlined on our understanding of its movements.

It was my hope when the pictures which you have already seen were made to be able to photograph the mammalian heart at such a high rate of exposure that the film, exhibited

at the usual rate, would give a reduction in apparent rapidity of motion to about one-tenth the natural. This hope has not been fully realized because of mechanical difficulties, but in the next picture shown you will see the contractions slowed down to about one-third of the rate at which the heart was beating. Close inspection will bring out the point which is essential to comparison of the warm blooded mammalian heart with that of the cold blooded; viz., that the contraction is really a wave passing over the heart from auricle to ventricle. In this sense then the progression of movement in mammal heart is similar to that in the frog's heart.

[Here a motion picture of the mammalian heart was exhibited. The exposures had been made at the highest speed of which the camera was capable, while projection of the film was made at the usual rate.]

Having developed the view that in the frog's heart the sequence of movements which make up the cardiac cycle is the expression of a wave of contraction beginning at the pacemaking sinus and progressing to the ventricle, and having shown in the last picture that we are justified in regarding the contraction in the mammalian heart as a progressive wave from auricle to ventricle, I now hope to show that the manner of initiation and manner of propagation is essentially the same in both.

As late as 1892, the assumption was generally accepted by students of the heart's movements that a profound difference exists between the heart of lower vertebrates like the frog and that of mammals. In the hearts of lower animals no difficulty had been encountered in discovering a direct continuity of muscular structure from sinus to auricle and from auricle to ventricle and, as has been shown, the contraction wave travels from muscle fibre to muscle fibre from the more rhythmic to the less rhythmic parts of the heart. In the mammalian heart, however, no such continuity was known; on the contrary anatomical study showed a definite separation between the muscle fibres of the auricle and those of the ventricle by the development, in the auriculo-ventricular junction,

of strong rings of fibrous connective tissue. One writer, for example, states that after boiling a heart it was possible to separate auricles from ventricles without rupturing a single muscular fibre. This interruption forbade belief in the idea of direct propagation of contraction wave.

I have made no attempt to outline to you a controversy which occupied the minds of physiologists of this time—a controversy concerning the origin of the heart's contraction and the path of its propagation. It is now necessary to say that one group held that the beat originates in nerve cells situated within the heart and the contraction wave is propagated by nervous impulses reaching the various parts of the heart by way of nerve fibrils ramifying through its muscle. To these the alleged interruption of muscular continuity between auricle and ventricle in the mammal heart presented no difficulty since nerve fibres were known to pass from auricle to ventricle. Those, however, who believed in a muscular origin and transmission of heart beat were impelled by this belief to make further search for muscular connection between auricle and ventricle of mammalian heart.

In 1892, Stanley Kent of England described muscle fibres, embedded in the fibrous tissue between auricle and ventricle, which he believed to represent direct muscular connection between these parts. It remained, however, for the German anatomist, His, to discover a discrete connecting structure between auricle and ventricle of mammalian heart, the later study of which has proved enormously important. In 1893 he wrote: "After long search, I have succeeded in finding a muscle bundle which unites the walls of auricle and ventricle, and which up to this time has escaped observation.

"Whether this bundle really conducts the excitation from auricle to ventricle I can not assert with certainty since I have not tried the experiment of cutting it. But its presence is a fundamental point against the view of those who seek to prove the necessity of nervous conduction by absence of muscular connection between auricle and ventricle."

(Figures 8, 9 and 10 are representations of this "Bundle of

His" as it has been revealed by the work of subsequent investigators.)

Two years later, before the Third International Physiological Congress, His was able to announce that he had made the trial of cutting this bundle or muscle bridge between auricle and ventricle and that when this was done the ventricle no longer contracted at the same rate as the auricle. The one was independent of the other.

Figure 11 is a reproduction of a tracing made by Hering in 1905 illustrative of the phenomenon which His discovered. Light levers were attached to the auricle and ventricle of a dog's heart in which the bundle of His had been cut. The movements of the levers, caused by the contractions of the auricle and ventricle were recorded on a slowly moving blackened surface. In the figure, the upper tracing, A, records contractions of the auricles; the lower, V, contractions of the ventricle. It is obvious that the normal sequence of the contractions has been abolished, the rate of auricular contraction being about thrice that of ventricular.

Further study ten years later, particularly by Professor Erlanger, now of Washington University Medical School, St. Louis, confirmed His in every particular. Erlanger was able to adjust on this bundle a small screw clamp which could be loosened or tightened at will. On gradually tightening, so that the bundle was squeezed, it often happened that the ventricle contracted only once to auricle twice; a little tighter, once to auricle three times. Then further tightening and the contractions became independent, each going its own pace, the ventricle usually about one-third as rapid as the auricle.

These observations and experiments have established beyond reasonable doubt the conviction that the relation of auricular to ventricular contraction in higher animals and man is fundamentally identical with that in the frog and lower vertebrates. In the former, the muscular continuity is limited to a long narrow muscle bundle over which the contraction wave passes, while in the latter a broad sheet of muscle is provided.

It remains now to ask whether the relation of sinus to auricle

in the frog's heart is something which is without its analogy in the human heart, *i.e.*, whether the hearts of higher mammals fundamentally differ in this regard from the frog.

I have already stated that the mammalian heart possesses no chamber analogous to the venous sinus in the frog. The great veins empty directly into the right auricle instead of coalescing as in the frog to form the venous sinus. It is the venous sinus, you will remember, whose contractions set the pace for the frog's heart. Our question now is; In the development of animal forms what becomes of the venous sinus; where is the structure which sets the pace for the mammalian heart?

The answer to this question begins with the work of the anatomist, His. In studying the evolution of the heart he came to the conclusion that a portion of the right auricle of the human heart could be regarded as the counterpart of the venous sinus of the cold blooded heart. In Figure 12 is shown a rough representation of the limits of this area as he outlined it. It is largely submerged in true auricular muscle.

Years later, two English investigators, Keith and Flack, made a more thorough study. Careful microscopic examination of sections of the entire auricle showed them that a certain portion of this area which His had outlined was different in its structure from that of the rest of the auricle. The fibres which compose it are more compact, smaller, less distinctly striated, the nuclei are different. In Figure 12 its position is represented by the black club-shaped blotch extending downward from union of superior vena cava with right auricle.

Now if this "sinus node," as it was called, is the representative in the complex mammalian heart of the sinus venosus in the frog, it should be possible to show that this is the most highly rhythmic part of the mammalian heart and is accordingly the part where the cardiac cycle begins. The experiments which physiologists have made to test this indicate that this is true. It has been shown, for example, that warming this part of the heart accelerates the beat of the whole heart while cooling retards it. The same degree of warmth or cold applied to other parts has no effect; it has been shown that

when the heart is excised, this is the last part to stop beating; and it is found that if this part is separated by crushing from the rest of the heart the beat of the rest of the heart becomes slower just as does the frog's heart when the venous sinus is tied off.

I have mentioned the fact that when a muscle contracts an action current (electrical) develops in it and that this can be measured. By measuring the electrical changes in the beating heart it is found that this bit of muscle (sinus code) is the first to exhibit change of electric potential and this indicates that this is the point where the contraction begins.

Now to summarize: In the heart of the cold blooded frog, we have seen that the rhythm of contraction begins at the sinus, because this possesses the greatest intrinsic degree of automatic rhythmicity; the contraction wave is conducted from muscle fibre to muscle fibre, spreading over the more sluggishly rhythmic auricle until finally the ventricle, least excitable of all, contracts. The rate of conduction is such that time is permitted for the blood within one chamber to pass on into the next before the contraction wave excites it. Thus the perfect propelling power of the heart is developed.

In the complex mammalian heart the same circumstances are to be found, though the structures concerned have become much more complex. A bit of primitive sinus tissue remains in the right auricle near the entrance of the great veins. This is primitive in the sense that it retains to a higher degree than any other part of the heart the intrinsic capacity of automatic rhythmicity, *i.e.*, it beats of itself. The other parts of the heart are less spontaneously rhythmic but are easily excitable by stimuli which may reach them from elsewhere. Hence the primitive sinus node sets the pace, initiates the contraction wave; this passes over the auricles; their contents are expelled into the ventricles. The contraction wave of the auricle strikes the narrow muscle bridge, the bundle of His, which forms the muscular connection between auricle and ventricle, travels over it and is distributed throughout the muscular walls of the ventricle by the fine branchings which we have seen.

I wish now to show two pictures which show what may happen when the normal perfect coordination of the parts of the heart is interrupted. Both are experimental reproductions of conditions which may arise in disease of the heart. In the first very rapidly repeated electrical stimuli are applied to the right auricle. In consequence its rate becomes uncountably high, a tremendous number of stimuli are irregularly transmitted to the ventricle, some of which are effective, others not; hence is developed a rapid irregular and ineffective ventricular rate.

The second picture represents the effects produced when the irritability of the ventricular muscle fibres is greatly increased. Such increase in irritability may develop in the heart as a result of disease or as the result of the action of poisons. In this experiment it was brought on by the action of a toxic dose of strophanthin. Here we see the single coordinated powerful contractions of the muscle wall giving place to rapidly successive, tremulous, disorderly contractions of individual groups of muscle fibres. As a result of this "fibrillation" of the ventricle, its power to propel blood from the heart is lost. The circulation of blood ceases and the heart muscle, irremediably injured by lack of blood circulating through it, finally loses its irritability and comes to rest in a state of extreme relaxation.

In two other pictures we shall see effects illustrative of the nervous control to which the heart is subject. In the first of these, the vagus nerve, running from the brain to the heart, has been prepared so that an electrical stimulus can be applied to it. When the stimulus is applied the rate of the heart's contractions becomes, as you see, decidedly slower; indeed it may cause the heart to stop for a time. This nerve exerts a constant restraining influence upon the heart which prevents excessive, uneconomical utilization of its energy.

In the second of these pictures, the sympathetic (accelerator) nerve to the heart is stimulated. A marked increase in its rate becomes at once apparent.

These two nerves, vagus and accelerator, play an extremely

important part in the adjustments which are necessary between the heart's action and the changing demands which are put upon it as the result of bodily exertion.

The chief purpose which I have had in mind in constructing this talk has been this: to show, in the first place, the mystery with which investigators have been confronted in the study of this phenomenon of the beating heart; to show the development of ideas, suggestions and conceptions by the study of the same phenomenon in organisms low in the animal scale; and to show how ingenuity of study based upon these conceptions has succeeded in solving much of the mystery in the more complex structure and at the same time has demonstrated its essential identity in the vertebrate kingdom.

I have not alluded to practical applications: it may be sufficient to say that just as Harvey's discovery of the function of the heart laid the foundation for all accurate knowledge concerning the treatment of organic heart disease, so this newer information, obtained by men whose interests were relatively remote from those of practical medicine, is serving as the foundation for a sound and an important advance in the diagnosis and treatment of functional disorders of the heart.

THE USES AND SOURCES OF IMAGERY AND ALLUSION IN THE BIBLE

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In reading the Bible we must always bear in mind the fact that it has come to us from an Oriental people whose modes of life and manner of thought were determined largely by their race and environment and therefore differ in some respects from those of the Western world. If one has not already had this fact impressed on his mind by actual contact with Orientals, he will readily be brought to realize the immense importance of it in the study of the Bible by reading such a book as The Syrian Christ, the author of which says truly: "You cannot study the life of a people successfully from the outside. You may by so doing succeed in discerning the few fundamental traits of character in their local colors, and in satisfying your curiosity with surface observations of the general modes of behavior; but the little things, the common things, those subtle connectives in the social vocabulary of a people, those agencies, which are born and not made, and which give a race its rich distinctiveness, are bound to elude your grasp. There is so much in the life of a people which a stranger to that people must receive by way of unconscious absorption."[1] "And it is those common things of Syrian life, so indissolubly interwoven with the spiritual truths of the Bible which cause the Western readers of Holy Writ to stumble and which rob those truths for them of much of their richness. By sheer force of genius, the aggressive systematic Anglo-Saxon

[1] A. M. Rihbany, The Syrian Christ, Boston, 1916, p. 7.

mind seeks to press into logical unity and creedal uniformity those undesigned, artless, and most natural manifestations of Oriental life, in order to 'understand the Scriptures.'" To the Oriental the Annunciation was "in perfect harmony with the prevailing modes of thought and the current speech of the land"—"I do not know how many times I heard it stated in my native land (Syria) and at our own fireside that heavenly messengers in the form of patron saints or angels came to pious, childless wives, in dreams and visions and cheered them with the promise of maternity." "To the Orientals 'the heavens declare the glory of God' and the stars reveal many wondrous things to men." "Deeps beyond deeps are revealed through that dry, soft and clear atmosphere of the 'land of promise,' yet the constellations seem as near to the beholder as parlor lamps." "So great is the host of the stars seen by the naked eye in that land that the people of Syria have always likened a great multitude to the stars of heaven or the sand of the sea."[1]

Ordinary ideas of the Oriental often seem to the Anglo-Saxon extraordinary, demanding analysis and explanation. The physical characteristics of Palestine and the customs of the inhabitants are the natural reasons for many of the modes of expression, and figures of speech employed in the Bible, which present interesting questions not only in regard to the source of the imagery, but also in regard to the constant use of it.

Much of the finest poetry of the Bible is contained in single lines or couplets, in which the poet by his use of imagery, or allusion, rises into the higher regions of the imagination, and gives us a wonderfully beautiful and significant picture. The following verses illustrate the use of familiar sights of Palestine. They tell of the great-out-of-doors world so characteristic of the Bible:

"The trees of Jehovah are filled with moisture, The cedars of Lebanon which he hath planted; Where the birds make their nests: As for the stork, the fir-trees are her house." Psalm 104:16–17.

[1] A. M. Rihbany, The Syran Christ, pp. 11, 12, 31, 32.

"As willows by the water-courses." Isaiah 44:4.

"A tree planted by the streams of water." Psalm 1:3.

"For he grew up before him as a tender plant, And as a root out of a dry ground." Isaiah 53:2.

"In the morning they are like grass which groweth up, In the morning it flourisheth, and groweth up; In the evening it is cut down and withereth." Psalm 90:5–6.

"Canst thou bind the cluster of the Pleiades, Or loose the bands of Orion?" Job 38:31.

"He giveth snow like wool; He scattereth the hoar frost like ashes. He casteth forth his ice like morsels: Who can stand before his cold? He sendeth out his word and melteth them: He causeth his wind to blow, and the waters flow." Psalm 147:16–18.

"The grass withereth, the flower fadeth; But the word of our God shall stand forever." Isaiah 40:8.

"We do all fade as a leaf." Isaiah 64:6.

"The fading flower of his glorious beauty." Isaiah 28:4.

"As a lily among thorns, So is my love among the daughters." Song of Solomon 2:2.

"He feedeth his flock among the lilies." Song of Solomon 6:3.

"And his heart trembled, and the heart of his people, As the trees of the forest tremble with the wind." Isaiah 7:2.

"I smote you with blasting and with mildew and with hail in all the work of your hands." Haggai, 2:17.

The ordinary figures of speech used in the Bible require no special discussion, but there is one figure which is used constantly with the result of increasing greatly the appeal to the imagination by presenting, sometimes in considerable detail, a dramatic picture instead of an abstract idea. The common name of this figure is "personification," which usually means that inanimate objects or abstract ideas are spoken of as though they were persons. The use of this figure is characteristic of the writings of Dickens, for example, and gives them much of their highly imaginative character. As employed in the Bible the figure is better described by its Greek name "prosopopœia," for, in one of its most important uses, it consists, not in the endowing of inanimate objects, or abstractions, with personality, but in representing an actual person as present, or as speaking, when this will add force or vividness

to what is said. The effect is usually very beautiful as in these examples:

> "Mercy and truth are met together;
> "Righteousness and peace have kissed each other."
> Psalm 85:10.

> "Then justice shall dwell in the wilderness;
> "And righteousness shall abide in the fruitful field." Isaiah 32:16.
> "The deep saith, It is not in me;
> "And the sea saith, It is not with me." Job 28:14.
> "Doth not wisdom cry,
> "And understanding put forth her voice?" Proverbs 8:1.

These give us dramatic scenes. There are persons, and there is action. This sort of prosopopœia is common enough. There is, however, another sort, equally common, which, though not generally so thought of, is really a literary device to increase the force of what is said. It consists in putting a fictitious but appropriate speech into the mouth of a real person, as Thucydides did in writing his History of the Peloponnesian War. It is asserted by critics that the speeches of Paul, in Acts, are of this kind.[1] This second variety of prosopopœia is found in the Song of Deborah, Judges 5, which is a song of triumph, containing a series of pictures. We see Jehovah marching "out of the field of Edom," and the earth trembling, and the mountains quaking at his presence (vs. 4–5). We see also the street or road, with people on it, riding on white asses, sitting on rich carpets, or walking by the way (v. 10). We see the battle (vs. 19–23), the rout, and then the terrible scene in the tent (vs. 24–27). The description of the fall of Sisera is for power unexcelled in literature:

> "He asked for water, and she gave him milk;
> She brought him butter in a lordly dish.
> She put her hand to the tent-pin,
> And her right hand to the workmen's hammer;
> And with the hammer she smote Sisera,
> She smote through his head;
> Yea, she pierced and struck through his temples.

[1] See Percy Gardner, Cambridge Biblical Essays, London, 1909, pp. 381–419. Essays XII, "The Speeches of St. Paul in Acts."

At her feet he bowed, he fell, he lay;
At her feet he bowed, he fell;
Where he bowed, there he fell down dead." Judges 5:25–27.

Of those closing lines Lowell wrote:[1] "Are we not made to see as with our eyes the slow collapse of Sisera's body, as life and will forsake it, and then to hear his sudden fall at last in the dull thud of 'he fell down dead,' where every word sinks lower and lower, to stop short with the last?"

And now we come to the example of prosopopœia, by which the poet suddenly turns our thoughts to another scene in a distant place. The man lying there dead had a devoted mother, proud of her son, and at this very moment eagerly awaiting his return in triumph bringing his share of the spoils of battle. Using the device known well to-day, and employed with great effect by those who represent plays by means of moving-pictures, we are not merely reminded of the anxious mother, actually far away, but we are made to see her, with her attendants, peering out through the lattice, and not only see her, but hear the words in which she tells her wise ladies what spoils Sisera will probably bring home:

"Through the window she looked forth, and cried,
The mother of Sisera cried through the lattice,
'Why is his chariot so long in coming?
Why tarry the wheels of his chariots?'
Her wise ladies answered her,
Yea she returned answer to herself,
'Have they not found, have they not divided the spoil?'
A damsel, two damsels to every man;
To Sisera a spoil of dyed garments,
A spoil of dyed garments embroidered,
Of dyed garments embroidered on both sides, on the necks of the spoil?"
Judges 5:28–30.

Here, as in the companion picture, we have the description proceeding gradually to a climax. Does the poet wish us to understand that this is the record of an actual conversation? Not at all. The whole scene is described as it is to make vivid the picture, to make the reader an eye-witness of both scenes.

[1] In his essay on Milton's Areopagitica.

The same kind of prosopopœia is employed repeatedly in Psalms where the actual words of Jehovah purport to be given in passages in which the poet is simply expressing what he believed to be the thought of Jehovah. This putting of words into the form of a direct speech increases greatly both the picturesque and the dramatic features, in which the Hebrew poet delighted. The change of person, and consequently of speaker, is a feature of many Psalms that is too often practically ignored by readers. As an example we may take Psalm 91 in which the "I" of the second verse is one man speaking to another man, the "thee" of the third verse. Beginning with the fourteenth verse is a different "I," who is Jehovah, soliloquizing as he looks down from heaven on the two men and hears what is said. The poet cannot be supposed to be quoting literally an actual speech of Jehovah. He makes wonderfully impressive the attitude of Jehovah towards men by giving us a speech in the first person. A similar dramatic use of the first person occurs for example, in these lines:

> "Who is this that cometh from Edom,
> With dyed garments from Bozrah?"
> "I speak in righteousness, mighty to save."
> Isaiah 63: 1.

Characteristic of Hebrew poetry is its out-of-doors setting. It is redolent of the fields, gives us pictures in almost every line of something in nature upon which the eyes of the poet were accustomed to rest, or interprets the scenes and natural features of Palestine as the work of God who created all things. The general aspects of the starry heavens, the sun and the moon, the changes in the sky, suggest the power and also mystery of God. Light and darkness, day and night, the changes of the seasons, storms, clouds, rains, the sea, rivers, floods common among mountains, snow, ice, the dew, these all are used as illustrations of prosperity and adversity, knowledge and ignorance, happiness and calamity, and other conditions and events in the lives of men and of nations. Much of the use made of nature and of great events is not strictly figurative. It is rather allusion with an implied comparison or teaching.

The Story of Creation is ever in the mind of the Bible poet. Of this examples will be found in:

"O Jehovah, our Lord,
How excellent is they name in all the earth,
Who hast set thy glory upon the heavens!
When I consider thy heavens, the work of thy fingers,
The moon and the stars which thou hast ordained;
What is man that thou art mindful of him?" Psalm 8 : 1, 3, etc.

"The Heavens declare the glory of God;
And the firmament showeth his handiwork." Psalm 19 : 1.

"By terrible things thou wilt answer us in righteousness,
O God of our salvation,
Thou that art the confidence of all the ends of the earth,
And of them that are afar off upon the sea;
Who by his strength setteth fast the mountains,
Being girded about with might:
Who stilleth the roaring of the seas,
The roaring of their waves,
And the tumult of the peoples." Psalm 65 : 5–7.

When Jesus wished to impress upon his disciples the folly of worry about the morrow he said:

"Behold the birds of the heaven, that they sow not, neither do they reap, nor gather into barns; and your heavenly Father feedeth them . . . Consider the lilies of the field, how they grow; they toil not, neither do they spin: yet I say unto you, that even Solomon in all his glory was not arrayed like one of these. But if God doth so clothe the grass of the field, which today is, and tomorrow is cast into the oven, shall he not much more clothe you, O ye of little faith?" Matthew 6 : 26–30.

In all these passages God is mentioned as the Creator and controller of the universe.

Common scenes are used as figures, or analogies, to illustrate moral or spiritual truth. Jesus, telling his disciples that their duties and opportunities were at hand, said:

"Lift up your eyes, and look on the fields, that they are white already unto harvest." John 4 : 35

For illustrations which should help to make clear the doctrine of the resurrection of the body, Paul turns to the fields and to the heavens:

". . . and that which thou sowest, thou sowest not the body that shall be, but a bare grain, it may chance of wheat, or of some other kind; but God giveth it a body even as it pleased him, and to each seed a body of its own . . . There are also celestial bodies, and bodies terrestrial; but the glory of the celestial is one, and the glory of the terrestrial is another. There is one glory of the sun, and another glory of the moon, and another glory of the stars; for one star differeth from another star in glory."
I Corinthians 15 : 37–41.

Of the profitable life Paul says:

"He that soweth sparingly shall reap also sparingly; and he that soweth bountifully shall reap also bountifully." II Corinthians 9 : 6

And of the inevitability of results from our lives, he says:

"Whatsoever a man soweth that shall he also reap." Galatians 6 : 7

James writes:

"For the sun ariseth with the scorching wind, and withereth the grass; and the flower thereof falleth, and the grace of the fashion of it perisheth: so also shall the rich man fade away in his goings." James 1 : 2.

Peter, writing of men who devote their lives to sin, calls them:

"springs without water, and mists driven by a storm." II Peter 2 : 17.

Jude speaks of men who "defile the flesh, and set at nought dominion" as:

"hidden rocks . . . shepherds that without fear feed themselves; clouds without water, carried along by winds; autumn trees without fruit, twice dead, plucked up by the roots; wild waves of the sea, foaming out their own shame; wandering stars." Jude, vs. 12, 13

To-day, as in the times of Abraham, of David, and of Jesus, the shepherd and his flocks are characteristic of the land, and the singing and piping goes on just as it has gone on for thousands of years. "Can anything be more poetic than this life of the Syrian shepherd! It ought to be religious too. Far, far away, out on the lone mountain, with the everlasting hills around, and the heaven above, pure, blue, high and still,

there go and worship free from the impertinence of human rhetoric . . . in spirit and in truth worship—in solemn silence and soul-subduing solitude worship the most high God in his temple not made with hands."[1]

Scarcely any detail of the shepherd's life is omitted in the many allusions to it in the Bible. Psalm 23 and John 10:1–29, are true to the life of the shepherd and the sheep.

Isaiah, ch. 28, closes with these lines describing the work of the farmer:—

"Give ye ear and hear my voice;
Hearken and hear my speech.
Doth he that ploweth to sow plow continually?
Doth he continually open and harrow his ground?
When he hath levelled the face thereof,
Doth he not cast abroad the fitches, and scatter the cummin,
And put in the wheat in rows, and the barley in the appointed place,
And the spelt in the border thereof?
For his God doth instruct him aright,
And doth teach him,
For the fitches are not threshed with a sharp threshing instrument,
Neither is a cart wheel turned about upon the cummin;
But the fitches are beaten out with a staff,
And the cummin with a rod.
Bread grain is ground,
For he will not be always threshing it:
And though the wheel of his cart and his horses scatter it,
He doth not grind it."

The parable of the sower, in Matthew, 13, with its interpretation, the preparation of the heart, as the plowing of fallow land; Hosea 10 : 12, the preacher, as the laborer in the field; 1 Corinthians 3 : 9, death, as the reaper; Psalm 90 : 6, the wicked as the stubble; Isaiah 47 : 14, trials, as the sifting of the wheat; these and many other references are familiar examples of figurative uses of farming.

Threshing and grinding are common figures, as is also "the chaff which the wind driveth away," Psalm 2 : 4. The wine-press too is referred to, and in one of the most exalted passages, already referred to in another connection, in Isaiah, we read:

[1] W. M. Thomson, The Land and the Book, London, 1889, p. 204.

"Who is this that cometh from Edom,
With dyed garments from Bozrah?
This that is glorious in his apparel,
Marching in the greatness of his strength?
'I that speak in righteousness mighty to save,'
Wherefore art thou red in thine apparel,
And thy garments like him that treadeth in the winevat?
'I have trodden the winepress alone;
And of the peoples there was no man with me:
Yea, I trod them in mine anger,
And trampled them in my wrath;
And their lifeblood is sprinkled upon my garments,
And I have stained all my raiment,
For the day of vengeance was in my heart,
And the year of my redeemed is come.
And I looked, and there was none to help;
And I wondered that there was none to uphold;
Therefore mine own arm brought salvation unto me;
And my wrath, it upheld me,
And I trod down the peoples in mine anger,
And made them drunk in my wrath,
And I poured out their lifeblood on the earth.' " Isaiah 63:1–6.

The vineyard and vine-growers are used often as figures, for example, in Isaiah ch. 5, the Song of Solomon, John ch. 15. Other occupations of Palestine are likewise similarly used, as that of the builder, I Corinthians 3:10; the fuller Malachi 3:2, Mark 9:3; the refiner of silver, Isaiah 48:10, Malachi 3:3; the merchant, Isaiah 47:15, Matthew 13:45. From the life of the shepherd, and that of the farmer and of the vine-grower comes much of the material and also the inspiration of the Hebrew poetry. This was pointed out long ago by Bishop Lowth to whom all subsequent writers on the subject are indebted. He said: "The sacred poets, in illustrating the same subject, make a much more constant use of the same imagery than other poets are accustomed to; and this practice has a surprising effect in preserving perspicuity."[1] The point of this is not that the Hebrew poet makes use of the daily occupations of his neighbors for purposes of simile or metaphor, but that a definite meaning has come to be associated with the

[1] Lectures on the Sacred Poetry of the Hebrews, p. 71.

incidents of those daily occupations, so that the relation of the shepherd to his flock, the farmer to his land and crops, and the vine-grower to his vineyard and its products, are constantly thought of in connection with the idea of the relation of Israel's God to his chosen people. This is, in general, true of almost all natural objects and scenes. God is seen in nature everywhere as its Creator:

"Who hath measured the waters in the hollow of his hand,
And meted out heaven with the span,
And comprehended the dust of the earth in a measure,
And weighed the mountains in scales,
And the hills in a balance?"

"Lift up your eyes on high
And see who hath created these,
That bringeth out their host by number;
He calleth them all by name;
By the greatness of his might, and for that he is strong in power,
Not one is lacking." Isaiah 40:12, 26.

The processes of nature both manifest and illustrate his relation to peoples and to individuals. Nature never became to the Hebrew a mere matter of formal illustration, as it became to the English poets of the seventeenth century, nor was there ever anything Wordsworthian in Hebrew poetry. God was above all, and controlled and regulated both nature and man. He did not reveal himself to man through nature in any Wordsworthian sense because, to the Hebrew, God revealed himself directly. He talked personally with Abraham, with Moses, with Joshua, with Samuel and with others. No intermediation of nature was thought of, although the heavens did "declare the glory of God." To the prophets he spoke directly, and they, as his ambassadors, spoke to the people to whom they were sent. There was no "pathetic fallacy" about the Hebrew poet's idea of nature. God clothed the grass, and arrayed more gloriously than Solomon the lilies of the field, Matthew 6:28, but how God did this was a mystery to the Hebrew. He did not profess to understand it. Attempts to explain the processes of nature, and the conclusion

that they are beyond human understanding, are set forth in such remarkable utterances, as we find in Psalms 104 and 139, and particularly in the closing chapters, 38–42, of Job. Job's words represent the Hebrew attitude towards nature:

> "I know that thou canst do all things
> And that no purpose of thine can be restrained." Job 42:2.

The larger natural features of Palestine play an important part in Hebrew poetry. "Among the mountains of Palestine, the most remarkable, and consequently the most celebrated in the sacred poetry, are Mount Lebanon and Mount Carmel; the one, remarkable as well for its height as for its age, magnitude, and the abundance of the cedars which adorned its summit, exhibiting a striking and substantial appearance of strength and majesty; and the other, rich and fruitful, abounding with vines, olives and delicious fruits, in a most flourishing state both by nature and cultivation, and displaying a delightful appearance of fertility, beauty and grace. The different form and aspect of these two mountains is most accurately defined by Solomon, when he compares the manly dignity with Lebanon and the beauty and delicacy of the female with Carmel."[1]

> "His aspect is like Lebanon, excellent as the cedars."
> The Song of Solomon 5:15.

> "Thy head upon thee is like Carmel,
> And the hair of thy head like purple:
> The King is held captive in the tresses." The Song of Solomon 7:5.

It was from the top of Carmel overlooking the sea that Elijah's servant saw the "cloud out of the sea, as small as a man's hand!" I Kings 18:44. Mt. Hermon, with its double peak (the reason probably for its name appearing in Hebrew sometimes plural or dual) lofty, snow-clad, covered often by clouds and mist gives us "the Dew of Hermon, that cometh down upon the mountains of Zion." Psalm 133:3. Numerous are the mountains that are mentioned in the

[1] Lowth, Lectures on the Sacred Poetry of the Hebrews, p. 75.

Bible, and important are the events recorded in connection with them. Calvary, Ebal, Ephraim, Gilboa, Gilead, Gerizim, Hor, Horeb, Moriah, Nebo, Olives, Paran, Pisgah, Seir, Sinai, Tabor, Zion. What ideas and associations do many of these suggest!

To the list of mountains we may add a similar list of valleys, Achor, Ajalon, Baca, Berachah, Elah, Eshcol, Gibeon, Hinnom, Jehoshophat, Megiddo, Rephaim, Shaveh, Shittim, Siddim, Sorek, Succoth, but, it will be noted at once that the mountain tops, and not the valleys, were the scenes of the greatest events.

The peaceful, well-watered valleys are often in the poet's mind, as are also the many wildernesses or wild sparsely-settled places used as pasture. The idea that a leveling of the land was a thing greatly to be desired seems to be contained in the words of Isaiah 40:3–4, quoted in Luke 3:4–5:

> "The voice of one that crieth,
> Prepare ye in the wilderness the way of Jehovah,
> Make level in the desert a highway for our God.
> Every valley shall be exalted,
> And every mountain and hill shall be made low;
> And the uneven shall be made level,
> And the rough places a plain:
> And the glory of Jehovah shall be revealed,
> And all flesh shall see it together;
> For the mouth of Jehovah hath spoken it."

The numerous caves which exist in the mountains of Palestine played an important part in the lives of many individuals, such as Lot, who with his two daughters dwelt, for safety, in a cave, Genesis 19:30; Abraham, who purchased the cave of Machpelah as a tomb, Genesis 23:9; the five Kings, who hid in a cave at Makkedah, Joshua, 10:16; the people who hid in caves for protection from the Philistines, I Samuel 13:6; David, who hid in the cave of Adullam, I Samuel 22:1; II Samuel 23:13; Saul, whose life was spared by David, in the cave at En-gedi, I Samuel 24:10; the prophets, whom Obadiah hid by fifties in a cave, I Kings 18:4; Lazarus, whose tomb was a cave, John

11:38; the people who were driven to caves by persecution, Hebrew 11:38, see also Isaiah 2:19.

These caves are frequently in the minds of the poets, especially in reference to refuge from danger. There is of course, at times, the idea of the ancient cities of refuge, Numbers 35:11, but those were only for the shedders of blood, while the idea of a general refuge is much broader as in Psalms 31:3, 71:3, 94:22.

With the idea of the desert, through which the people had traveled in the Exodus, the edges of which extended to the eastern borders of Palestine, and of the desert tracts in Palestine itself, is associated the beautiful figure of Psalms 91:1.

> "He that dwelleth in the secret place of the Most High
> Shall abide under the shadow of the Almighty."

We have such figures as these taken directly from the nature of Palestine:

> "A man shall be as a hiding-place from the wind,
> And a covert from the tempest,
> As streams of water in a dry place,
> As the shade of a great rock in a weary land." Isaiah 32:2

References to the sea are not uncommon, although the sea was not, like the mountains and valleys, always before the eyes of the poet. The fact that John conceives of the new earth as a place in which there will be "no more sea," Revelation 21:1, may have reference to what was a fact, that the sea was not regarded with pleasure in Bible times. But this attitude towards the sea is not peculiar to the Jew of old. The poetry of the sea, beyond allusions, is most of it modern, as is also, doubtless for the same reason, the poetry of the mountains. Certain general aspects and suggestions of both mountains and sea are recognized in ancient literature, the mountains suggest permanency, and the sea instability and change, but our modern ideas of the universe, and our improved means of travel and of protecting ourselves against the assaults of the elements, have had perhaps much to do with modifying our thoughts concerning them. Biblical references to the sea

mention only its power, its restlessness, its changefulness, its treachery. Job says:

"Am I a sea, or a sea-monster,
That thou settest a watch over me?" Job 7:12.

The Psalmist writes:

"Yonder is the sea, great and wide,
Wherein are things creeping innumerable,
Both small and great beasts.
There go the ships;
There is leviathan, whom thou hast formed to play therein."
Psalm 104:25–26.

"They that go down to the sea in ships,
That do business in great waters;
These see the wonders of Jehovah,
And his wonders in the deep.
For he commandeth, and raiseth the stormy wind,
Which lifteth up the waves thereof.
They mount up to the heavens,
They go down again to the depths:
Their soul melteth away because of trouble.
They reel to and fro, and stagger like a drunken man,
And are at their wit's end.
Then they cry unto Jehovah in their trouble,
And he bringeth them out of their distresses.
He maketh the storm a calm,
So that the waves thereof are still.
Then they are glad because they are quiet;
So he bringeth them unto their desired haven."
Psalm 107:23–30.

What a volume of meaning is conveyed by the lines:—

"He maketh the storm a calm,
So that the waves thereof are still.
Then they are glad because they are quiet."
Psalm 107:29,30.

On the sea of Galilee the disciples were in danger in their small boat, Matthew 8:24, and Paul had a rough experience with the Mediterranean, ending with shipwreck. Acts 27:6-44.

Isaiah, more than any other poet in the Bible, speaks of the

sea, as one who has seen it, in calm and in storm, and has noted its changing aspects. He refers not only to the "pleasant imagery" of "the ships of Tarshish," Isaiah 2:16, but also to the boisterous sea beating against the cliffs:

> "And they shall roar against them in that day,
> Like the roaring of the sea:
> And if one look unto the land,
> Behold, darkness and distress;
> And the light is darkened in the clouds thereof." Isaiah 5:30.

And of the sea washing in on the beach:

> "But the wicked are like the troubled sea;
> For it cannot rest,
> And its waters cast up mire and dirt." Isaiah 57:20.

A splendid passage in which, in Hebrew, by the use of long vowels and doubled consonants Isaiah has expressed "the slow lift and roll of the billows—their distant booming, their crash and hissing sweep along the Syrian coast,"[1] much of which will be felt on reading the English translation aloud, is the following:

> "Ah, the uproar of many peoples,
> That roar like the roaring of the seas;
> And the rushing of nations,
> That rush like the rushing of mighty waters!
> The nations shall rush like the rushing of many waters
> But he shall rebuke them,
> And they shall flee far off,
> And shall be chased as the chaff of the mountains before the wind,
> And like the whirling dust before the storm." Isaiah 17:12–13.

Isaiah writes also:

> "Oh that thou hadst hearkened to my commandments!
> Then had thy peace been as a river,
> And thy righteousness as the waves of the sea." Isaiah 48:18.

He gives a wonderful picture of the Nile and of those who depended upon it for a living, the drying up of the Nile being a terrible calamity.

[1] G. A. Smith, The Early Poetry of Israel, pp. 6, 7.

"And the waters shall fail from the sea,
And the river shall be wasted and become dry.
. . . . . .
And the fishers shall lament,
And all they that cast angle into the Nile shall mourn,
And they that spread nets upon the waters shall languish."
Isaiah 19 : 15–8.

Bibical poets give us pictures, not only of the sea, the mountains and the fruitful fields, but also of the life of a great city, with its swiftly moving panorama, embracing the good and the bad, the rich and the poor. Isaiah speaks of the harlots, the haughty daughters of Zion that "walk with outstretched necks and wanton eyes, walking and mincing as they go, and making a tinkling with their feet," Isaiah 3 : 16. He enumerates their articles of—adornment, "their anklets, and the cauls and the crescents; the pendants and the bracelets, and the mufflers; the headtires, and the ankle chains, and the sashes, and the perfume-boxes, and the amulets; the rings and the nose jewels; the festival robes, the mantles, and the shawls, and the satchels; the hand-mirrors, and the fine linen, and the turbans and the veils," Isaiah 3 : 18–23. A somewhat similar description of adornments is given in Ezekiel 16 : 10–16, in the denuciation of Jerusalem, which played the harlot, and John in his vision, Revelation 17 : 4–5, beheld the harlot arrayed in all her fine clothing and jewels. These descriptions are all from life as seen in the cities.

Isaiah describes the drunkards that "reel with wine and stagger with strong drink;"

"The priest and the prophet reel with strong drink,
They are swallowed up of wine,
They stagger with strong drink;
They err in vision, they stumble in judgment." Isaiah 28 7.

The drunkard is a common illustration, and the results of drunkenness, such as brawling and quarreling, Proverbs 20 : 1, Ephesians, 5 : 18, are held up as warnings.

The caravans, the coming and going of which were so important in Palestine's prosperity, were in the author's mind when he wrote of the coming glory of Zion:

"The multitude of camels shall cover thee,
The dromedaries of Midian and Ephah;
All they from Sheba shall come;
They shall bring gold and frankincense,
And shall proclaim the praises of Jehovah." Isaiah 60 : 6.

In Proverbs 8 : 3, we have the vivid picture of Wisdom standing "Beside the gate, at the entry of the city" and calling to the people as they go in and out. Job gives us a scene in the streets of a city, with men of all kinds passing by:

"When I went forth to the gate unto the city,
When I prepared my seat in the street,
The young men saw me and hid themselves,
And the aged rose up and stood;
The princes refrained from talking,
And laid their hand on their mouth;
The voice of the nobles was hushed,
And their tongue cleaved to the roof of their mouth.
For when the ear heard me, then it blessed me;
And when the eye saw me, it gave witness unto me." Job 29:7–11.

"Salutations in the marketplaces" were greatly valued by men who liked to appear important. Luke 20 : 46. Isaiah speaks of the merchants of Tyre who are "princes," and traffickers, who "are the honorable of the earth." Isaiah 23 : 8. Another figure from the street scenes is found in Psalm 59 : 6, 14, where the poet says of his enemies:

"They return at evening, they howl like a dog,
And go round about the city."

Sometimes the figures used, and pictures suggested, are those of household life, vivid and forceful as:

"I will wipe Jerusalem as a man wipeth a dish, wiping it and turning it upside down." II Kings 21 : 13.

or:

"Moab is my wash pot; upon Edom will I cast my shoe."
Psalm 60 : 8.

or:

"Fervent lips and a wicked heart
"Are like an earthen vessel overlaid with silver dross."
Proverbs 26 : 23.

The poet has in mind the life of a family:

"Thy wife shall be as a fruitful vine,
In the innermost parts of thy house;
Thy children like olive plants,
Round about thy table." Psalm 128 : 3.

Or parental love:

"As one whom his mother comforteth,
So will I comfort you;
And ye shall be comforted in Jerusalem." Isaiah 66 : 13.

Like as a father pitieth his children,
So Jehovah pitieth them that fear him. Psalm 103 : 13.

Sometimes it is the bearing of burdens by means of a yoke:

"Thou shall shake his yoke from off thy neck." Genesis 27 : 40.
"My yoke is easy, and my burden is light." Matthew 11 : 30.

Again it is the driving cattle:

"The words of the wise are as goads." Ecclesiastes 12 : 11.

The figures are often taken from familiar works of man:

"Behold I lay in Zion for a foundation a stone, a tried stone, A Precious corner-stone of sure foundation." Isaiah 28 : 16.

"His heart is as firm as a stone;
Yea, firm as the nether mill-stone." Job 41:24.

We see and hear the beekeeper hissing to call his bees:

"And will hiss for them [the Nations] from the end of the earth;
And behold they shall come with speed swiftly." Isaiah 5:26.

"And it shall come to pass in that day,
That Jehovah will hiss for the fly,
That is in the uttermost part of the rivers of Egypt,
And for the bee that is in the land of Assyria.
And they shall come, and shall rest all of them
In the desolate valleys, and in the clefts of the rocks,
And upon all thorn-hedges, and upon all pastures." Isaiah 7:18.

Other sources of figurative language were Chaos and Creation:

"I beheld the earth,
And, lo it was waste and void;
And the heavens, and they had no light.
I beheld the mountains and lo they trembled,
And all the hills moved to and fro." Jeremiah 4:23.

The Deluge is probably in the poet's mind when he writes:

"The windows on high are opened
And the foundations of the earth tremble." Isaiah 24:18.

The Exodus and its many incidents are referred to in a number of passages.

"Thou broughtest a vine out of Egypt;
Thou didst drive out the nations, and plantedst it." Psalm 80:8

"And Jehovah will utterly destroy the tongue of the Egyptian sea;
And with his scorching wind will he wave his hand over the River,
And he will smite it into seven streams,
And cause men to march over dryshod." Isaiah 11:15.

"Thus saith Jehovah
Who maketh a way in the sea,
And a path in the mighty waters;
Who bringeth forth the chariot and horse,
The army and the mighty man:
They lie down together, they shall not rise;
They are extinct; they are quenched as a wick." Isaiah 43:16–17.

"Is it not thou that driedst up the sea,
The waters of the great deep;
That madest the depths of the sea a way
For the redeemed to pass over?" Isaiah 51:10.

"Where is Jehovah that brought us up
Out of the land of Egypt,
That led us through the wilderness,
Through a land of deserts and of pits,
Through a land of drought and of the shadow of death,
Through a land that none passed through,
And where no man dwelt?" Jeremiah 2:6.

The appearance of God is described in language that takes us back to the thunderings and lightnings and smoking mountain of Exodus, ch. 20, where the giving of the Law is described. Such passages are Psalm 18:7–15, and Habakkuk 3. Jehovah

speaks in the storm, Job 38:1, and Psalm 29, a poem of nature is the description of a thunder-storm which is called "the voice of Jehovah."

The symbolic vestments of the priests and the services of the Tabernacle and the Temple are likewise sources of figurative expression. Jehovah "clothed with majesty," "clothed with strength," "girded with strength" all suggest the dress of the priests as described in Exodus, ch. 29. A striking passage in which garments and armor are used figuratively is this from Isaiah:

> "And he put on righteousness as a breastplate,
> And a helmet of salvation upon his head;
> And he put on garments of vengeance for clothing;
> And was clad with zeal as a mantle." Isaiah 59:17.

Later Paul used figuratively the armor of the Roman soldier:

> "Stand therefore, having girded your loins with truth, and having put on the breastplate of righteousness, and having shod your feet with the preparation of the gospel of peace . . . taking up the shield of faith . . . the helmet of salvation and the sword of the Spirit, which is the word of God." Ephesians 6:14–17.

The apocalyptic books abound in imagery much of which was not so much metaphor or analogy as pure symbolism such as the conception of the new Jerusalem, in Revelations, a city "foursquare," "the length, and the breadth and the height thereof" being "equal." The Oriental manner of expressing ideas picturesquely and concretely, instead of abstractly, leads to the notable use of imagery in the Bible.

THE OUT-OF-DOOR ESSAYS OF MR. W. H. HUDSON

By Cornelius Weygandt

Professor of English Literature

It has taken our generation all its thirty years to find out that Mr. W. H. Hudson is one of the masters of English prose. He came before us in 1885, as a teller of tales, with "The Purple Land that England Lost," but the corner of Argentina he so called had little interest for his kin in England and Ireland and America. Few read the book, fewer talked of it, and the reviewers almost all passed it by with faint praise.

The ornithologist could not thus neglect the two volumes of "Argentine Ornithology," which followed in 1888–89, for Dr. Sclater's name preceded Mr. Hudson's on the title page. They were well reviewed, for their additions to knowledge, in the scientific journals, and gave to Mr. Hudson some reputation as a field naturalist and a describer of little known birds. Only two hundred copies of "Argentine Ornithology" were printed, however, and its scope gave Mr. Hudson few chances to catch in words aspects of out-of-doors at moments of poignant beauty. That is his greatest power, and no man I know, in our tongue, and no man, I believe, in any other, not Loti himself, has rescued from Time so much of the passing beauty of the world.

It has been the luck of Mr. Hudson to know out-of-doors in two very different lands, Argentina and England. There were hours of hours in both countries that could not fade from his mind and that are now his readers' forever through the magic of his words. Hours of autumn when the grassy pampas of La Plata were "white and faintly blushing" under amber light; winter hours in Patagonia when the wastes were bleakly grey and desolate; hours on the Sussex downs when

thistle seed was drifting by in hosts, diffusely white under the high blue of summer skies; October hours in Hampshire under ivied walls loud with the hum of late bees. Hours of spring, too, in Derbyshire, for instance, when the ring-ouzels were answering one another across high pastures, walled and stone ledged.

There are a thousand and one such moments in the twenty books of Mr. Hudson, all ours to recall when we will by turning to our shelf of those dogeared and worn volumes. At thought of them only, great moments they treasure come back to mind. On opening them one after another we find marked passage after marked passage, so many were the good things we, reading, felt we must keep at hand. And there come to us, too, other moments of wonder, not in them, but to which they brought us by their quickening of our wits and their sharpening of our vision. That "British Birds" (1895), for instance I carried with me wherever I went in the four countries of the British Isles, and through its help identified this bird or that. So it was that the dipper I came on by the streamside in the high pass between Cork and Kerry, and the choughs that flew into our dining room on Achill and stole fishbones from the plates before us were other than they would have been without Mr. Hudson's descriptions of them. And so, too, what he has written colored the impressions made on me by the wagtail at Grasmere and the robin in Dollar, the curlews on Lammermuir and the lapwings under Eildon, the swallows about Selbourne and the larks over "Edgon Heath."

It was an earlier book than "British Birds," however, that introduced me to Mr. Hudson. I came first on his name in the classroom in a passage from "Idle Days in Patagonia" (1893) quoted at second hand in a rhetoric book from some writing of William James. That passage interested me and I looked up "Idle Days in Patagonia." It took me wholly captive, and from that day to this, twenty-three years, it has been a growing delight to me to be reading Mr. Hudson. It was perhaps lucky for me it was "Idle Days in Patagonia" that I came upon first, for this book strikes a new note in literature so clearly that I could not help but recognize it. Had I first

chanced on "The Purple Land" I might not have had eyes to see what quality he had for neither in the attitude toward life it reveals, nor in its style is it Mr. Hudson in full power. And had I come first on "The Naturalist in La Plata" (1892) I might have been concerned more with its facts about pumas and llamas, rheas and tinamous, wasps and spiders, than by its promise of a great prose.

It was in his two books of 1893, "Birds in a Village" and "Idle Days in Patagonia," that Mr. Hudson reached sure artistry. It was these two books, too, that brought him recognition by his fellow writers. He had come to England from Argentina in 1876. It had been, then, a long struggle for him, a struggle of seventeen years, to gain a place in English letters, and even now it was but a success of estimation. Nearly another seventeen years was to pass before Mr. Hudson could be said to have an assured place, and it has been only in the past five years, during which his books have been reprinted in America, that he has been in any real sense popular. He is, of course, far from a best seller today, but an author who can boast of a five column review in the *London Times*, a review that leads its "Literary Supplement," as does that of "The Book of a Naturalist" on November 7, 1919, must be acknowledged to have come into his own. From 1887, when Mr. Hudson published an article on "Recollections of My Childhood" in "The Gentleman's Magazine," he had been writing about his boyhood in La Plata. It was not until 1918, however, that even these young years received anything like full expression. Then he published "Far Away and Long Ago," recollections of the good days from three to fifteen. Just how good he considered them you may gather from his declaration, "All the interesting part of my life ended when I was fifteen." Because of this declaration we do not feel so keenly the lack of detailed knowledge of his later years in Argentina and his earlier years in England. We have, indeed, beside "Far Away and Long Ago," only scattered references in his other books from which to build up a biography of him. We would like to know more, after all, of these days he values so little.

And this desire is not idle curiosity. A writer's art is always the man himself, and the essayist's art is so closely the reflex of his life that we instinctively wish to know directly of that life that we may see just how he has transformed its experiences into art.

Mr. Hudson has written more about England than about Argentina, yet Argentina is almost always in the back of his mind whatever he writes about. What he says about the interesting part of his life ending at fifteen is proven largely true by this constant reference to his early days and by the persistence even into his most recent work of habits of observation and ways of thought that came to him while he was a lad. This place before his eyes of middle years in Somerset recalls that he knew in infancy in Argentina; this place in Wiltshire he comes to at seventy carries him back to that so like and yet so unlike it on the pampas of his boyhood. Those earlier years he never forgets; they made him and their memories are more to him than anything that has happened to him since. The happiness of these days seems to him, in retrospect, the greatest happiness he has known. Then he had health, and freedom, and a mother's love. Other good things, despite ill health and poverty and loneliness, have come to him since, but none of the natural joys of manhood have made up to him what he lost with his boyhood, not joy of work or joy of love not joy in art or joy in fame.

Mr. Hudson is a shy man, a reserved man, a proud man, and he has not chosen to indulge in that sort of gossip about himself that delights those skilled in the advertising of authors. Even in his specifically autobiographical writing there is much more about his states of mind and impulses and emotions than about his family and the daily life of its members. So chary is he of dates that his own birth year is nowhere clearly stated. It would seem from one account that he was six when the dictator Rosas fell: another passage in his writing makes it possible he was eight at that time. As the overthrow of Rosas occurred in 1852 Mr. Hudson would appear to have been born in 1844 or 1846.

The place where he was born is certain, an estancia on the pampas of La Plata a day's ride from Buenos Ayres and close by a deep creek some six miles west of its juncture with the River Plata. His father was a settler in Argentina, of English and Irish ancestry, and his mother a New England woman through whose Merriam blood he claims kindred to our American ornithologist Mrs. Florence Merriam Bailey. His father was not a successful rancher, but there was apparently enough money in the family to keep up a great establishment in the primitive fashion of the pampas, at "The Twenty-One Ombu Trees" for the first five years of the boy's life, and then with diminishing prodigality at the more inland home "Los Acacias." It is with this latter place, where were not only the locusts that gave it its name, but old Lombardy poplars and great peach trees, that most of his boyhood's memories are associated. Mr. Hudson was the third of four brothers, and there were two sisters. He had a great admiration as a child for his oldest brother but it was his mother that was most to him of all his family.

There were books in the home, religious works and natural histories and selections from old poets, and friends who came to visit the family were people of cultivation. One brought the bird-loving boy White's "Selborne." As he grew older he read the poets more and more carefully, finding their descriptions of nature had so much more glamour than had the cold accounts of the natural histories. As a young man Mr. Hudson frequented the book stores of Buenos Ayres, discovering there copies of Thomson's "Seasons" and of Bloomfield's "Farmer Boy," to add to the Shenstone of the family library and the Akenside and others of teacup times so largely quoted in its great tomes. "Prosperous English people," Mr. Hudson writes, "sent their children home to be educated at that time, but it was enormously expensive and we were not well off enough." So they had what schoolmasters fate brought to the door, one who had been an actor and another who had been a priest, wastrels both, but neither for long an upsetter of the free life of the children.

Their neighbors were too far off, most of them, for there to be much intimate neighborliness. Many of those on the nearest ranches were Britons, Irish, Scotch, and English sheep-farmers, people hardly so picturesque in their lives as were the gauchos. These gauchos that Mr. Hudson presents in his autobiography are more vividly picturesque, I think, than most of the characters in his novels and short stories. You will not soon forget them, Barboza the knife-fighter and ballad-singer; that breeder of piebald horses, Don Gregorio Gandara; Don Anastacio, exquisite and pig-fancier; and, most memorable of all, that patriarch of the pampas with his six wives, Don Evaristo Peñalva.

Mr. Hudson was a hardy boy, able, he tells us, easily to "outrun and outjump any of my gaucho playmates, even those who were three or four years older than myself." But, much as he delighted in rough sport, in shooting and riding, he had from an early age that characteristic of the child who loves to be alone, an animistic love of nature. By "animism" Mr. Hudson means "the tendency or instinct, in which all myth originates, to *animate* all things; the projection of ourselves into nature; the sense and apprehension of an intelligence like our own, but more powerful in all visible things." Many boys have felt this power in nature, though usually at later years than eight, the time Mr. Hudson began to feel it. It is more usual at twelve, say, or fifteen.

Consider Wordsworth's lines about "the yellow primrose" just a moment, in illustration of this power.

> "A primrose by a river's brim,
> A yellow primrose was to him
> And it was nothing more."

To one who felt no more than this man there was no animism in nature. Such a one could not see, maybe, the beauty of the flower, its stiff precision of form, he could not enjoy its yellow with all of early spring in it, and he could not delight in its scent. Such a one had not, surely, any association with the yellow primrose; it had not been his spoil in childhood,

nor had a girl given it to him with lovelight in her eyes, nor had his eye fallen on it as the sexton dropped earth into his mother's grave. But even had he been moved by this flower through associations with it he had not known the joy that is brought by animism. To know that joy that scent of the flower must have been a transporting thing, a scent as of dawn in Eden; its color must have lifted his heart, at sight of the plant there above the swirling water, as the yellow of March sunsets lifts the heart to a cold rapture beyond his power to explain. Such as this must have been the experience of a man to know what Mr. Hudson means by animism.

Mr. Hudson remembers a time in his youth when all things in nature were hardly more to him than such a" yellow primrose" to the practical man. Then, he writes (Far Away & Long Ago, p. 227): "I rejoiced in colours, scents, sounds, in taste and touch: the blue of the sky, the verdure of earth, the sparkle of sunlight on water, the taste of milk, of fruit, of honey, the smell of dry or moist soil, of wind and rain, or herbs and flowers; the mere feel of a blade of grass made me happy; and there were certain sounds and perfumes, and above all certain colours in flowers, and in the plumage and eggs of birds, such as the purple polished shell of the tinamou's egg, which intoxicated me with delight. When riding on the plain, I discovered a patch of scarlet verbenas in full bloom, the creeping plants covering an area of several yards, with a moist, green sward sprinkled abundantly with the shining flower-bosses, I would throw myself from my pony with a cry of joy to lie on the turf among them and feast my sight on their brilliant colour."

This that I have just quoted Mr. Hudson describes as "mere childish delight in nature." The "something more," the animism, was "evoked more powerfully by trees than by even the most supernatural of my flowers; it varied in power according to time and place and the appearance of the tree or trees, and always affected me most on moonlight nights. Frequently, after I had first begun to experience it consciously, I would go out of my way to meet it, and I used to steal out of

the house alone when the moon was at its full to stand, silent and motionless, near some group of large trees, gazing at the dusky green foliage silvered by the beams; and at such times the delight would change to fear, and the fear increase until it was no longer to be borne, and I would hastily escape to recover the sense of reality and safety indoors, where there was light and company. Yet on the very next night I would steal out again and go to the spot where the effect was strongest, which was usually among the large locust or white acacia trees, which gave the name of Los Acacias to our place. The loose feathery foliage on moonlight nights had a peculiar hoar aspect that made this tree seem more intensely alive than others, more conscious of my presence and watchful of me."

In his sixteenth year the Hudson family returned impoverished to the old home by the Ombu trees; it was all the father had left. And shortly after that Mr. Hudson suffered a terrible soaking by a mid-winter rain while driving cattle. "The result," he writes, "was rheumatic fever and years of bad health, with constant attacks of acute pain and violent palpitation of the heart which would last for hours at a stretch." On his illness followed doubts as to the faith in which he had been brought up and on those doubts the death of his mother. It was his delight in nature that gave him what comfort he could get now, that was almost his only solace. There were to follow hard years but in them were "long periods of fairly good health and . . . happiness in the solitary places I loved to haunt, communing with wild nature, with wild birds for company."

From what I gather from his writings Mr. Hudson did the work that the seasons brought about his father's ranch, and worked elsewhere as cattleman and surveyor. He also made a business of taking bird-skins, sending his first collection to the Smithsonian Institute at Washington in 1868. He was in communication with Dr. Sclater at this time, and from 1870 he contributed to the "Proceedings of the Zoological Society" of London. In 1871 Mr. Hudson spent those months on the Rio Negro which gave him the material for his "Idle

Days in Patagonia." He was keeping careful notes now and he had these as well as his memories to use years later in England in writing "The Naturalist in La Plata."

It must have been, I suppose, the desire to make a place for himself as a writer that took Mr. Hudson to England in the mid-seventies. He nowhere tells us why he left Argentina, but with a man of his history and ambition it seems to me my guess cannot be far wrong. He called it "going home" as so many British colonists do, and in later years he appears to be partially reconciled to his loss of the freedom of the pampas by the thought of their wild animals and birds so rapidly disappearing before the hordes of Italian immigrants.

The necessities of hackwork and ill health kept Mr, Hudson confined to London pretty closely during these early years in England, but even in his worst times, he tells us "shut out from Nature . . . for long periods, sick and poor and friendless I could yet always feel that it was infinitely better to be than not to be." High heart and faith in his dream carried him through to success despite all obstacles. In his own lifetime he finds himself written down as a fellow of Walton and White, of Thoreau and Jefferies. Of their lineage, he is an imitator of none of them, a follower of a mode of his own, as great a writer as the out-of-door essay has known. It is to the English poets that Mr. Hudson has gone for the making of his style, to their treatment of nature. It is not to be wondered, then, that his best passages have the exaltation of lyrics, and delight us as this lyric of Herrick or that of Wordsworth, this lyric of Emerson or that of Frost.

It is of the best of Mr. Hudson I so write, not of what he calls his "bread and cheese books." Of these, perhaps, is "Birds in London" (1899), a topical study, of course, and one that is more interesting for its facts than as literature. It rounds up, in its several chapters, the dirbs of the great city, with explicit reference to where this one is found and where that. There is no doubt Mr. Hudson was interested in doing the book but it seldom permits him that freedom out of which come his best passages. It is written to order and

so cannot be the overflow of glad moments, as are his best books. Of these is, surely, "Nature in Downland" (1900).

All of us know the lift of heart a man feels when he is on a hill top. This lift is partly, perhaps, the result of deep drinkings in of the keen air of heights, partly, perhaps, because of the sense of freedom that comes with a wide prospect. Our joy of height, though, may have deeper springs than these. On high hills were men's first temples and on high hills the earthworks in which he sought safety from his enemies for his family and his flocks. No seacliff or forest depth seems half so old or half so holy as high bare hills, and no high bare hills seem higher or barer than the Sussex Downs. It is their age, their centuries of association with men that most moved Mr. Hudson in the weeks of summer he had on them. Of their three most common, most typical sights he wonders which "carries us further back in Time: the cluster of cottages, with church and farm buildings, that form the village nestling in the valley, and, seen from above, appearing as a mere red spot in the prospect; the cloaked shepherd, crook in hand, standing motionless on some vast green slope, his grey, rough haired sheep-dog resting at his feet; or the team of coal-black, long-horned oxen drawing the plough or carrying the corn."

Always, in any countryside, beside the look of the place before his eyes, is in his inner eye the image of what it was on some long forgotten yesterday, a yesterday in Cobbett's time or Shakespeare's, in Alfred's time or in the Stone Age. Not Mr. Hardy himself has a keener sense of the past, or a greater power to recall it. It is not, I think, by any effort of the will that Mr. Hudson recalls the past; it arises spontaneously in his consciousness. He meets a woman well into her seventies and, instantly, by her side, before his mind's eye, is the image of her as a bride. It was just a word from the old body that did it, a word about a flower she loved still as she loved it in old time. At that word a girl stood before him with her arms full of wild musk, yellow and wet from the waterside.

One day Mr. Hudson found himself among the rushes at Athelney, rushes dwindling away in a half dry marsh. Sud-

denly the landscape about him took on an aspect of thousands of years ago, and he saw the "swart Iberian" punting his dugout through tall reeds, "miles on miles of them of dark polished stems, tufted with ruddy brown." It is England as England was even before the Celts had come across the channel. This picture, a picture from ancestral memory some would say, rose at the sound of the wind in the reeds, but another picture, too, rose, one from his own memories of boyhood in Argentina, "vast marshes of the pampas . . . where sitting on my horse the tufted tops of the bulrushes were on a level with my face."

There is no book of Mr. Hudson that reveals him more fully than "Birds and Man" (1901). All that he can do, save to tell stories and to draw character, he does in these so differing chapters. One is full of beautiful and glad moments out-of-doors caught in lyric words; another is memorable because of its descriptions of bird song. Another divines with startling intuition that we love best among flowers those that are blue and those that are white pink-tinted because of the associations of these colors with the color of the human eye and the color of flesh. Another ponders with searching analysis why it is that writing about Nature has changed so since the day of Gilbert White, finding the cause of the change in the fact that now-a-days "heart and soul are with the brain in all investigation."

In "British Birds" Mr. Hudson had written that "most persons would agree in regarding the nightingale, song thrush, blackbird, blackcap and skylark as the five best songsters." Now, however, in "Birds and Men," he confesses that he loves the song of the woodwren "best of all." So it is a description of this song I would take to show Mr. Hudson with all his heart in his writing. Not Thoreau's description of the bobolink's song is a finer thing, or Burrough's of the hermit-thrush, or Jefferies' of the blackbird. You are tempted, so good is it, to hazard comparison of it with the great poems of our language that catch the quality of bird song:

"It is a voice of the beechen woods in summer, of the far-up

cloud of green translucent leaves, with open spaces full of green shifting sunlight and shadow. Though resonant and far-reaching it does not strike you as loud, but rather as like the diffused sound of the wind in the foliage concentrated and made clear—a voice that has light and shade, rising and passing like the wind, changing as it flows, and quivering like a wind-fluttered leaf. It is on account of this harmony that it is not trivial, and that the ear does not grow tired of hearing it: sooner would it tire of the nightingale—its purest and most brilliant tones and most perfect artistry."

In 1902 came "El Ombu," Mr. Hudson's second collection of short stories, or tales, or sketches, call them which you will. This book is now published as "Tales of the Pampas" in the American edition. There are those who greatly admire these stories, and one critic has gone so far as to call "A Piebald Horse" "the finest short story in English." As much has been said so many times about this story or that of O. Henry or Kipling, of Henry James or Bret Harte, that it need not, perhaps, be taken seriously. Such a statement, however, may do harm by alienating from Mr. Hudson those who might like his out-of-door essays but who would be irritated by so extravagant praise of what is, after all, work in an incompletely mastered mode. I have had pleasure in the stories of "El Ombu," as in those of "The Purple Land" but it seems to me, as I intimated above, that for all their savour of wild life little known to readers of English literature and their picturesque incident, their characterization is less vivid and their reading of life less sure than that characterization and reading of life in much of his other writing, "A Shepherd's Life," and "Far Away and Long Ago," for instance. Nor are they as interesting in their revelation of Argentine life as are the tales of Mr. Cunninghame Graham.

Three other books of Mr. Hudson may be classed as fiction. "Green Mansions" (1904) is a long story, a romance of forest and mountains in the back country of Venezuela. A large part of its appeal is derived from the descriptions of the country. That might be expected in Mr. Hudson but what

might not be expected is his great success in the presentation of his heroine. She is the last of her race, a race one inevitably associates with the Incas, and as such she has the charm that so often is found in doomed and passing things. What is best in the delineation, however, is the extraordinary intimate sense Mr. Hudson gives us of her birdlike voice and ways, her will-o'-the-wisp flitting here and there, her hamadryad's agility in running about on boughs of great trees. "Green Mansions" is a tragic story, almost wantonly tragic, for where so much is marvelous, the marvel of happiness would not seem strange.

"A Little Boy Lost" (1905) is a series of strange episodes that befall a child strayed from home in Argentina. It springs, probably, as much of his work, from memories of his boyhood in La Plata, but it involves, too, some folk-tales of the native Indians. It is a book intended for grownups, I think; certainly it does not take the children I know as does "Uncle Remus" or "The Wind in the Willows."

With "A Crystal Age" (1906) Mr. Hudson's experiments in fiction end. "A Crystal Age" leaves an impression, there is no doubt of that, but that impression is not so much that of a story as of a picture, a large canvas by Leighton. Some details of it persist in memory, too, again pictures, this one of mural decorations in the great communal house and that of a sketch of countryside, parklike and stiller than any landscape of our earth. I care little for its dream of the world as it may be in a far tomorrow, with people of exquisite manners and of the morals of the beehive. The story is so detached that I cannot care keenly for the defeated heart's desire of the hero, who has tumbled so grotesquely out of the England that we know into a land out of place and out of time.

It would be easy to labor this question of Mr. Hudson as story writer, to try to find place for him among the many men who have laid the scenes of their tales in alien lands. Mr. Cunninghame-Graham whom I have mentioned, is nearest him, but there are a score other. There is the Herman Melville he admires so wholeheartedly, and Stevenson and Kipling, and

Sir Hugh Clifford and Richard Curle, and, of course, Joseph Conrad. Need I mention more than these few to enable us to see Mr. Hudson in proper perspective as story writer? And does he bulk larger against that large background of prophetic books from Samuel Butler to Sir Thomas Moore, or, if you like, to Plato? "A Crystal Age" is not exactly an "Erewhon" or an "Utopia" or a "Republic." My concern is, fortunately, with Mr. Hudson as writer of the out-of-door essay, so I am not called upon to commit myself further in an estimate of him as a writter of fiction.

After the return of Mr. Hudson to fiction with "El Ombu" in 1902 he published only one more book of out-of-door essays until he was through with fiction with "A Crystal Age" in 1906. This one book was "Hampshire Days" in 1903, Mr. Hudson at his very best. As Hampshire is one of the counties environing London Mr. Hudson could reach its byways even, whenever he had leisure and the strength for a day's outing. It is not his most loved corner of England, that is Wiltshire, but there is no part of England that he knows better, countryside and cottages, birds and people. For years Hampshire was his nearest refuge from the crowds and fog, a refuge only too seldom possible of attainment. It was, apparently, not so much ill-health and poverty that held him to the great city as it was the marketing of his writing. He had to be where were the magazines to which he contributed his essays. Subjects for articles, I suppose, had to be talked over with editors, and articles when written, reshaped or cut according to the exigencies of the magazine in which they were to appear. He could not always, in these years, write what he would but he had to do articles that suited the market. When he collected these he called the volumes, as I have said ,"bread and cheese books." Even these are, of course, not without value, for, being the writer that he is, no conformity or straightjacketing could take the life out of his writing.

"The Land's End" (1908), a book about Cornwall, is, perhaps, of this "bread and cheese" variety. Yet it has in it a very interesting reading of the Cornishman's character and

temperament. The Cornishman is generally held to be a Celt, but if he is a Celt we must readjust our opinions of the Celt, because the Cornishman is lacking, according to Mr. Hudson, that power of imagination and that picturesqueness of speech we have held characteristic of the Celt. There is even a suspicion of the guide book about "The Land's End" and a touch here and there of what is topical, talk about what is of the hour only. The book is, however, redeemed not only by this reading of the Cornishman I have referred to but by many passages of high beauty, among them a fascinating description of heath fires.

There is less to redeem "The Book of a Naturalist" (1919), for here the interesting chapter is not a thing of beauty but a militant controversial tract, "The Great Dog Superstition." Mr. Hudson has been bitterly attacked for his attitude in this paper, hardly, it seems to me, with justice. It is not really an attack on the dog as "the friend of man," but the revolt of a lover of all animals against the singling out of one, and one alone, as "The friend of man." Equally worthy of man's affection as pets Mr. Hudson holds several other animals to be, the lemur and the marmoset, squirrels and the big Argentine rodent the vizcacha, the chincilla and the cats. No one who has read Mr. Hudson fully would believe for a moment that Mr. Hudson took this position toward the dog through any affectation of singularity. Nor is it an idiosyncrasy of the author, like his love of snakes, but just as I have said, a rising of the gorge at what he considers overpraise of a universally favored animal.

"Afoot in England" (1909) and "Adventures among Birds" (1913) are collections of characteristic papers of a very diversified sort, and both distinguished by fresh observation, kindling imagination and lyric writing. Both are full of the charm of place. Places, indeed, have gradually become more and more to Mr. Hudson. To catch the spirit of each that moved him and to impart its atmosphere are as desirable to him now as was once to record his sensation on seeing a rare bird, a condor, say, in Argentina, or a Dartford warbler in England.

"A Shepherd's Life" (1910) is a book of another sort, a book built up largely from one Wiltshire peasant's memories of his quiet days. The old man talked much to Mr. Hudson, and that talk so interested him that he visited the places the shepherd had known in his long years with sheep. It is a very human book, and of a kind that is rare in our literature. Our poets have given us many sketches in little of such men, and our essayists have presented aspects of their life, but you must go to Hardy or to Phillpotts for a fellow to this man. Even in their novels, however, you will find no such full length portrait.

It was only to be expected, perhaps, that this following in the footsteps of so kindred a spirit as the shepherd would lead Mr. Hudson in the end to home. When he visited the shepherd's birthplace, Winterbourne Bishop, he felt at home there as he never had before in England. The little village on the high downs, windswept and bare, of few trees and wide prospects, was in many ways like the place of his first memories in Argentina. This association with the place on which his eyes first opened to the wonder of the world accounts, too, for this saying of Mr. Hudson of three years later ("Adventures among Birds" p 162): "I love open spaces best, wide prospects from doors and windows, and the winds free to blow on me from all quarters." So, too, it accounts for this declaration of cows: "Their morning and evening lowing is more to me than any other sound—the melody of birds, the springs and the dying gales of the pines, the wash of waves on the long shingled beach."

A man who has so much pleasure in what many are pleased to call the little things of life must be a happy man. And a happy man Mr. Hudson is to be written down. Hard time as he has had he is not of those who cry out against the established order of things, save when that order sanctions cruelty to birds or beasts or men. The last word of "Far Away and Long Ago" sums up his own adventure in life with this sane optimism: "Call them sportsmen ornithologists, or bird-lovers pure and simple, I envy them their magnificent freedom and

could ask no happier life than theirs . . . To pursue wild birds in that way—to follow knowledge like a sinking star, to be and to know much until I became a name for always wandering with a hungry heart—that was my one desire; but alas; it was never in my power. Compared with the disincumbered ones I am like an ordinary man, walking on the earth, to men of higher bodies and nimbler minds who have found out how to fly and are like birds chasing birds."

One wonders whether the artist's joy in the creation of what is beautiful has been any compensation to Mr. Hudson for this strenuous life that he has missed. He has in certain moods repudiated our civilization, referring more than once to "other, better, less civilized days," and in other similar moods he has praised out of the way places like western Cornwall as "outside of and remote from civilization with its feverish restlessness, vices and dreadful problems!"

We must remember, too, that Mr. Hudson was man of action before he was artist. Those were wild days in Argentina, those days of his youth. There was always war between Reds and Whites, between one faction in politics and another; Indian raids were not a thing of the past; men settled private quarrels with the knife; jaguar and puma lurked along the watercourses; cattle ranching involved dangerous work even if stampedes and prairie fires were infrequent; and nature itself with its floods and its storms, its scourging summers and its devastating winters added to those hardships that made the life of the Argentine settler far from a sheltered one.

And yet, as I have said, if Mr. Hudson had not the life of action he longed for he has had the joy of the artist in making beauty out of his experience of life. He cannot but know that he has caught more of the beauty of landscape and more of the charm of place in his essays than any other writer.

A hundred incidents in the writing of Mr. Hudson reveal him as a fellowly human being, as a man delighting in his friends and at ease with them in cottage or hall. Yet the old love of the wild breaks out again and again. "There are times and moods," he writes ("Hampshire Days" p. 50) in which

"it is revealed to us, or to a few among us, that we are a survival of the past, a dying remnant of a vanished people, and are like strangers and captives among those who do not understand us, and have no wish to do so; whose language and customs and thoughts are not ours. That 'world-strangeness,' which William Watson and his fellow poets prattle in rhyme about, those, at all events, who have what they call the 'note of modernity' in their pipings, is not in me as in them. The blue sky, the brown soil beneath, the grass, the trees, the animals, the wind, the rain, and sun, and stars are never strange to me; for I am in and of and am one with them; and my flesh and the soil are one, and the heat in my blood and the sunshine are one and the winds and the tempests and my passions are one. I feel the 'strangeness' only with my fellow men, especially in towns, where they exist in conditions unnatural to me, but congenial to them; . . . when I look at them, their pale civilized faces, their clothes, and hear them eagerly talking about things that do not concern me. They are out of my world—the real world. All that they value, and seek, and strain after all their lives long, their works and sports and pleasures, are the merest baubles and childish things; and their ideals are all false, and nothing but by-products, or growths of the artificial life—little funguses cultivated in heated cellars."

Remembering what his experiences had been we can understand why Mr. Hudson writes (Birds in a Village. p. 180): "Perhaps I was too long a doer, herding too long with narrow foreheads, drinking too deeply of the sweet and bitter cup, to experience that pure and unfailing delight in literature which some have."

Yet his very writing contradicts him. That writing draws a great deal of its ecstasy from his reading of English poets, and his joy in Nature, great as it was in his youth before he saw the world through their eyes, could not be what it is now had he not read them again and again. I know no writer who has remembered more of English poetry than Mr. Hudson. He quotes much; he paraphrases more; he still more frequently

writes lyrically because the poets have given him the words to express gladness and exaltation, dream and vision, wonder and the splendor of the world.

"My chief interest and delight," he tells us in another mood (Hampshire Days, p. 168), "is in life — life in all its forms from man who walks erect and smiling looks on heaven to the minutest organic atoms — the invisible life."

And as he finds interest and delight in all forms of life so, too, he finds interest and delight in all of his own life, even in harsh fortune and suffering. At times he makes almost a god of pain: "As things are designed in this world of sentient life there can be no good, no sweetness or pleasure in life, nor peace and contentment and safety, nor happiness and joy, nor any beauty or strength or lustre, nor any bright and shining quality of body or mind, without pain, which is not an accident nor an incident nor something ancillary to life, but is involved in and a part of life, of its very colour and texture."

Is this the Scotch-Irish blood coming out in Mr. Hudson, we wonder, or that English Puritan blood that his mother inherited from the Merriams of New England? There is no evidence in his writing to show that Mr. Hudson is widely read in philosophy so it may well be his ancestry is responsible for his belief. Or it may be his own experience has compelled him to applaud pain. Is there anything parallel in the case of John Davidson, who, Scotch and a sufferer, also applauded pain? It is interesting, at any rate, to put certain passages from "The Testament of a Vivisector" over against the above passage from "Hampshire Days."

One is again and again driven to the poets for parallel passages to the readings of life in Mr. Hudson. How like Meredith, for instance, is this that follows, and how it must have delighted him, did he chance upon it, to whom Nature was "a stern mother, whom no cry can melt:" "For all who have conquered or outgrown the killing instinct, an impartiality that pets nothing and persecutes nothing is doubtless man's proper attitude towards the inferior animals; a godlike benevolent neutrality; a keen and kindly interest in every

form of life, with indifference as to its ultimate destiny; the softness which does no wrong with the hardness that sees no wrong done." (Birds in a Village, p. 174–175.)

That is one attitude of Mr. Hudson towards animals. He cannot help but take another when he thinks of the worldwide destruction of birds. Such thoughts arouse the propagandist in him, but he includes little propagandist writing in his books, surprisingly little when you know how active he has been in all movements in England looking toward the preservation of bird life.

In some moods Mr. Hudson even goes so far as to say that he thinks some men are as low as the animals. "Who shall venture to say," he queries in "Adventures among Birds," "that the two-legged upright or man-shaped mammalian of Tierra del Fuego or the Andaman Islands or the Aruwhimi forest, is capable of a feeling beyond the power of elephants, dogs, seals, apes, and in fact of all other vertebrates — beasts, birds, reptiles and fishes?"

The scientist that is in Mr. Hudson is, like the propagandist, kept within bounds. Where it devolves upon him to be detailed, as in "Argentine Ornithology," he is detailed. But he nowhere makes a fuss about discoveries, say of birds in Argentina, or a parade of knowledge of habits, when that is his in larger measure than anybody's else. One of the birds he discovered, of the woodhewer family, was named after him by Dr. Sclater. Mr. Hudson's account of the nesting habits of the Argentine cowbirds is a considerable addition to science. All this scientific side of him, however, is servant, in his maturer years, to the artistry in writing that is his greatest gift.

How great this gift is, I have quoted again and again to show. I could not, of course, quote enough to prove my assertion that Mr. Hudson has put into words more glad moments out-of-doors and more of the beauty of landscape than any other writer. Only Loti and Ruskin seem to me to approach him in this respect. Other writers of the out-of-door essay, Thoreau and Jefferies, Burroughs and Beebe, for four,

have given us much of the beauty of nature, but none of them, I think, so much as Loti and Ruskin. We can, then, compare Mr. Hudson to writers out of his mode as well as in it. I have not time to consider passages of his alongside of passages of Bacon and Browne, of Emerson and Meredith, of Synge and Dunsany. It is obvious, of course, that unlike these men Mr. Hudson is not a phraser of sentences that are readings of life in brief. You will find in Mr. Hudson few sentences that are memorable in the way of "Men fear death as children fear to go in the dark;" or "the iniquity of oblivion blindly scattereth her poppy;" or "Hitch your wagon to a star." But you will find passage after passage that you may read again and again, as I said, as you read your favorite lyrics. Read this for one "I have spent many a night in the desert, and when waking on the wide silent grassy plain, the first whiteness of the eastern sky and the fluting call of the tinamou, and the perfume of the wild evening primrose have seemed to me like a resurrection in which I had a part; and something of this feeling is always associated in my mind with the first heard notes of Chantecleer" (Birds in a Village, p. 148).

Read this of a lesser thing, just a hornet, for another: "As he comes out of the oak-tree shade and goes swinging by in his shining golden red armature, he is like a being from some other hotter, richer land, thousands of miles away from our cold, white cliffs and grey seas."

Read this for a third: "The last occasion on which I saw the pampas grass in its full beauty was on the close of a bright day in March (a fall day we of the northern hemisphere must remember), ending in one of those perfect sunsets seen only in the wilderness, where no lines of house or hedge mar the enchanting disorder of Nature, and the earth and sky tints are in harmony. I had been travelling all day with one companion, and for two hours we had ridden through the matchless grass, which spread away for miles on every side, the myriads of white stems, touched with varied colour, blending in the distance and appearing almost like the surface of a cloud. Hearing a swishing sound behind us, we turned

sharply round, and saw, not forty yards away in our rear, a party of five mounted Indians, coming swiftly towards us; but that very moment we saw them their animals came to a dead halt and at the same instant the five riders leaped up, and stood erect on their horses' backs. Satisfied that they had no intention of attacking us, and were only looking out for strayed horses, we continued watching them for some time, as they stood gazing away over the plain in different directions, motionless and silent, like bronze men on strange horse-shaped pedestals of dark stone; so dark in their copper skins and long black hair against the far-off ethereal sky, flushed with amber light; and at their feet, and all around, the cloud of white and faintly blushing plumes."

This last passage is not only a thing of beauty but a symbol of an era of Argentina that is gone, a symbol of a life that is passing from the world. It is often with passages of Mr. Hudson as with this passage. They are of things some would call provinical but their humanity is so basic and their imagery so clear that they can be understood and appreciated anywhere.

That such passages are not read everywhere is perhaps in the nature of things. In our age the essay carries around the world only when it reverberates with a preachment. A story or play of a new kind of beauty and not topical has on publication a chance of a hearing; a book of poems not topical a half chance; a book of essays not topical, not on an issue of the times, one chance in a hundred. Yet even the essay's lack of popular appreciation cannot prevent such a book, if it is great, from making its appeal to men. And when book on book of essays of first power beat on the public's resistance, that resistance will eventually be worn away. The roll of great books by Mr. Hudson is now nine at least, "Birds in a Village" and "Idle Days in Patagonia" "Nature in Downland" and "Birds and Men," "Hampshire Days" and "Afoot in England," "A Shepherd's Life" and "Adventures among Birds," "Far Away and Long Ago." Few of our essayists have so many to boast, and few of all our great writers of prose any more.

BIRD-LORE OF THE NORTHERN INDIANS

By Frank G. Speck

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Men and their manners naturally hold first rank in the attention of the student and traveler. And yet whatever contributes to our experience is also of equal importance whether it be found in the animal or vegetable kingdom. In the realm of nature, birds are such social, intelligent and active beings that in the combination of the two spheres of observation, man-kind and birds, we find pleasant and profitable employment. The world of bird-life seems to have engaged the lively interest of men in ancient as well as in modern times, for there is hardly any part of creation within the reach of our observations which exhibits a more glorious display. Such a variety of pleasing scenes as the bird world shows, ever changing throughout the seasons, arising from various causes, and destined for different purposes, naturally held a strong appeal to the primitive men who dwelt in the forests of North America. These scenes were free to the enjoyment and inspection of various tribes who developed different reactions to them under the influence of their differing inner lives. They observed that the order of birds, like themselves, constituted tribes and bands, separated by their different structure, manners and utterances, as each tribe, though subdivided into smaller groups, retains its form in customs and language particular to that nation or genus from which it seems to have descended.

It may be said, I think without exaggeration, that the native Indians live much closer to Nature than most white people could hope to do. Their knowledge of wild life is therefore inexhaustible in quantity though it is often far from being scientifically correct. From their childhood, girls are taught much practical botany, the identity and use of scores of plants.

The boys, accompanying their fathers on the hunt, learn the habits of wild animals with an intensity of interest that is only found in matters of vital importance. This applies of course to the tribes of the north who practice no agriculture and whose subsistence is gained solely by the hunt. In their natural history it is to be expected, moreover, that the Indians are better mammalogists than ornithologists, since the observation of birds is something of a fine art with them; not an essential to their success in the life-sustaining chase. Likewise, we also find that considerably more superstition, folk-lore and fancy at large, are connected with their knowledge of birds. The birds in general are considered by these people to form a race of beings, subdivided into tribes just as people are, with their head chief and minor chiefs and local groups. Ordinarily the eagle is spoken of as the head chief of the birds but in the copious native mythology there is frequent mention of mythical birds such as the Wampum Bird, the Great Bird, the Wind Bird, and *Gellu*.[1] Their description makes them out to be monstrous creatures; in some stories they are more comparable to the Roc of European lore. It is needless to say that birds figure prominently in the mythology of the natives but the allusions are so numerous that to treat them one would have to summarize the whole body of tradition. The partridges figure somewhat as dupes in the stories, the owls as solemn or mischievous characters, the herons as majestic indifferent beings and many other smaller birds assume the rôles of helpers, hinderers, tell-tales and the like. In different stages of the same story perhaps the hero may assume a bird guise at one time, his own form or an animal guise at another. The stories also betray some interpretative ability on the part of the myth-makers because the psychological traits of the creatures, as they appear to the observer, are often faithfully brought out, as for instance friendliness, reciprocal obligation, malice, apathy, stealth, thievery and so on.

[1] Gellu has, however, in Penobscot some attributes ascribed to him which make it at least possible that the great auk, which formerly inhabited the New England coast, is meant.

When, however, we come to what would correspond to actual Indian ornithology we find knowledge to be based really less upon observation than upon interpretation. We learn for instance that in some past age the reign of winter was uninterrupted by the intrusion of any warm season, and that a body of adventurers went to the southland to try to secure the "summer fluid" to bring it back north with them. This they did not succeed in doing until they had captured the summer birds from the south and brought them north. Having secured these, one of the characteristics of the summer season, summer itself followed in their wake and thenceforth has continued its annual habit.[1]

NOTE.—We may take the Penobscot Indian names and beliefs as the basis of discussion in this paper, because from my own experience with this tribe I am more able to undertake etymological analysis and partially because the information is more abundant. The Penobscot occupied central and northern Maine. Related fables and names from the Malecite of St. Johns river, New Brunswick, the Abenaki of St. Francis, Canada, and the Micmac of Nova Scotia, are also given, since all these tribes belong to the same culture group, known in ethnographical literature as the Wabanaki. The dialects of the four tribes are fairly close, though, as we shall see, the bird names and indentities do not always correspond in all of them.

In giving the names, the Penobscot words are noted by Pen., the Malecite by Mal., the Micmac by Mic., and the St. Francis Abenaki by St. Fr. The numbers in parentheses are the American Ornithologists' Union check list numbers. These will provide for the ornithologist a reference list of the birds which I identified in the Penobscot country. I found C. A. Reed's Pocket Bird Guides very useful in this work in the Indian villages, as the informants could recognize the creatures from the cuts. In writing the Indian words it is necessary to use some characters that may not be understood. Crossed *l* (*ɬ*) denotes a lateral not unlike the Polish sound or Welsh *ll*, *k* and *g* are not sharply differentiated, an aspiration following a vowel denotes an open breath following it, small *n* after and above the line of a vowel denotes nasalization, the long vowels are marked so above them, and small capital A is used to represent *u* as in *but*, while small capital E represents an obscure vowel like *e* in *her*.

[1] From the Saulteaux who live near the Height of Land in Ontario comes a version of the same tale, adding the pretty conception, however, of the Milky Way as "The Birds' Pathway" during the migrations.

The family of the divers and swimmers naturally claims a large share of the attention of the northern natives whose homes lie among the rivers and lakes where these large and conspicuous birds resort during the breeding season. Naturally, too, the natives have been close observers of the differences of cry and in appearance manifested in this family. The prominent temperamental and economic characteristics of these birds have caused them to appear as figures in many of the mythical narratives and beliefs of folk-lore. Among them the loon stands forth rather sharply. His name "choice, admired bird"[1] shows the esteem which he has earned by his constancy as a weather prophet, his beautiful plumage and his thrilling cry. The loon is regarded as a model of constancy both in story and in reality. To kill one is a sacrilege. Its attenuated cry, which echoes in stirring tones across the lakes and bays of the north, is regarded among the Wabanaki as a wail of grief for the loss of a lover; which event forms the theme of a legend. A brother and sister enamoured of one another, the story runs, eloped. Hotly pursued by their kinfolk, they were overtaken at last while crossing a frozen lake. At the moment when punishment was about to be administered, the ice gave way, the pair sank out of sight before the eyes of the indignant pursuers and rose again the next instant in the form of the loon, uttering the cry which is still the call of these mysterious birds. The lovers then became the celestial constellation which we call Orion. To the ears of European and Indian this cry has taken different values. The French Canadians hear it as *huard*, while in Ontario the Ojibwa hear it as *mānk*.

The Micmac say that to hear a passing loon give forth a laugh is a sign of coming happiness, but the mournful cry of the bird is to them harbinger of sorrow. The loon again

[1] (A. O. U. 7) Pen. *mEde'wīłe*, "choice, admired bird," Mal. *Agwún*. The Red-throated Loon (A. O. U. 11) is Pen. *mÁngwis*. The corresponding *mank* is also the name of the common Loon in Ojibwa of Ontario. It is noticeable how inconstant are the identities and names in their distribution among various northern tribes whose languages are at the same time embraced in the single Algonkian stock.

figures in the mental imagery of the Micmac as the favorite bird of the deity Gluskap. The bird, it seems, originally had but one utterance, a laughing cry, during the sojourn of Gluskap upon the earth. Upon the departure of the deity from the world, however, the loon gave utterance to a long mournful cry which thenceforth became one of its characteristics.

Cormorants ply their way all summer along the salt water ways of the country of the Wabanaki. Their peculiar form and their manner of squatting on rocks or projections near the water, has earned them an allegorical name, a rather plain, homely allusion. The Penobscot call the bird "old heel,"[1] from its fancied resemblance to an old worn-out moccasin lodged in a cleft of the shore.

The great auk,[2] now almost forgotten in the world by all except the ornithologists, is still remembered among the Penobscot as one of the legendary bird chiefs. While we may hesitate a moment in believing the strict identity of this now-extinct bird with the hero character in one of the creation tales, it nevertheless seems quite possible that the identity may be correctly assumed from certain traditional descriptive traits. The auk figures as the chief of a tribe which is visited by the chief deity of the Penobscot when his uncle desires to secure a wife. Auk's daughter is the girl selected, but before the suitor is accepted tests have to be undergone to prove his worth.[3] One of them is the test of jumping. The chief deity, Gluskabe, gives his uncle power enabling him three times to jump over auk's wigwam. The uncle, however, becomes over-ambitious and in attempting to make the jump the fourth time falls through the smoke-hole of the wigwam into the fire beneath where he burns his back into a hard crust and becomes a turtle, the ancestor of the shelly tribe.

The seashore birds, the gulls and the terns, are separated

[1] (A. O. U. 119) Pen. *wagwânes* "old heel;" Mal. *agwuns*.

[2] (A. O. U. 33) Pen. *gEllú;* Mal. *klu;* Mic. *kullú*.

[3] For an interesting discussion of the test theme in America, see R. H. Lowie, Journal of American Folk-lore, vol. xxi, 1908.

in terminology only by the denotation of size.[1] Throughout the Wabanaki area, gulls have onomatopœic names, which the Indians render as *kāk*. The terns are "small gulls," the name being the same as the preceding with the diminutive termination. We do not hear so much about gulls in the mythology of the east, but they stand forth as weather prophets and curiously in the capacity of earth-hunter, after the deluge, which corresponds to the place of the dove in Biblical mythology. The great black-backed gull from Nova Scotia frequently appears in the Penobscot country. His name is the same as in the English.[2]

Mother-Cary's chicken or Leach's petrel[3] is well known to the Indians of this region who frequently make protracted voyages in their frail canoes miles from the coast-line among the islands lying off the mouth of the Penobscot and Kennebec rivers. These little birds are correctly named from their habit of obtaining nourishment by scooping animal matter from the tops of waves as they patter over them in flight. Their English name petrel has evidently evolved from this appearance of walking on the surface of the water. The Penobscot name for them is "picking up grease (while skimming over the water)." For all of the preceding feathered tribes the Indians have great respect. None of them is killed or disturbed, because its flesh in not considered palatable except in times of famine.

The tribe of the ducks and geese is truly a great one in the life and belief of the northern Indians. The annual migration of this great family brings to them an abundance of food, in the securing of which intense activity and skill are required. Perhaps it is on account of the need of knowing the calls and cries of the ducks that we observe imitative names applied to the different kinds instead of the descriptive names which occur in European nomenclature. The black duck's cry

[1] (A. O. U. 51) Herring Gull, Pen. *kāk^{cw};* Mal. *kia^{c}k^{cw}.* (A. O. U. 70) Common Tern, Pen. *kiA^{n}zis;* Mal. *kiák^{cw}sis;* St. Fr. *kā'kwis.*

[2] (A. O. U. 47) Pen. *kāk^{cw}me^{c}kazéwipskAnAt,*" "gull black-backed."

[3] (A. O. U. 106) Pen. *mAnhī'bmet,* "picking up grease."

to Indian ears resounds as "*kwi-kwi*" whence its name, *kwī'kwī'messu*, "the creature (that cries) *kwi-kwi*."[1] The old squaw duck is *aha^{n}'wessu*. Its cry is thought to be *aha^{n}'wuli*. The element *aha^{n}* signifies "yes." So again we have the merganser in Penobscot, *wzī^{c}'kawe*,[2] another onomatopœic term. This word was taken over into English by Thoreau who in his fascinating journal written during a sojourn in the Maine woods frequently refers to the merganser as "Shicorway." I might venture to trace one more, an American place name, to the same Indian source. Chocorua, that superb mountain in New Hampshire, named from the unhappy Pennacook chief who was killed there, seems a possible relative to the above term. The wood duck, the beautiful feather mosaic of his family, seems not to have appealed much to the eyes of the Indians for the term "fresh water duck"[3] applied to the bird, denotes a characteristic of its habits rather than its appearance. We have again the scoter duck, whose frequency near the ocean has earned it the name "salt water creature."[4] Next the two toothsome cousins, the teals, appear under the Penobscot name "little mitten,"[5] an endearing name to the Indian mind accounted for by the resemblance of the bird's figure to that article of comfort indispensable to both Indian and white man. The Canada goose and the brant goose are both embraced under a common term derived from the idea "white;"[6] a term too old to lend itself to further explanation at present. The ducks and geese do not figure in folklore particularly as heroes; their rôle is the humble part of adjuncts to the play of action and fancy in the anima

[1] (A. O. U. 133) Pen. *kwī'kwī'messu;* Mal. *meg*Ez*áweit m*Ed*Eh*éssim "black duck."

[2] (A. O. U. 129) Mal. *ksī^{c}'ke.*

[3] (A. O. U. 144) Pen. *al*An*tegwī'ɬessu*, "river, or fresh water, bird," Mal. *al*An*t*Eg*wī'ess.*

[4] (A. O. U. 163–5) Mal. *sobégwīess* "salt water, ocean, bird;" St. Fr. *sobagwiiɬ aá.*

[5] (A. O. U. 139–140) Mal. *m*Eld*jéss*Es*is*, "little mitten."

[6] (A. O. U. 172, 173) Pen. *wā̆mpt*Eg*we;* Mal. *wáptuk^{cu};* Mic. *mog*Elewitc, Brant, *sīn*Em*k* Canada Goose.

stories. As weather signs and omens, however, there seems no end to their function.

The family of waders has at its head one whose name occurs several times in the myths as an important hero. The great blue heron whose proper name is *kā'sko*,[1] derived from his cry, is a bird of stately indifference, who in one story, however, lent valuable aid to a pair of fleeing lovers who were being pursued by a she-witch. They arrive at a rushing river which they cannot cross. A heron is standing on the banks resting upon one leg. The lovers wisely flatter the stately bird for his beauty of neck and leg, and upon this leg then as upon a bridge they are enabled to cross the torrent which bars their flight. The pursuing she-witch ridicules the heron when she arrives on the scene and is allowed to cross on the leg too, but in the middle the leg is suddenly turned and the detractor of the heron's charms is thrown into the rapids and destroyed.

The great blue heron, the bird of decadence, his kingdom the swamps and lagoons of the intermediate ages, so eclipses the rest of his tribe that all the others are indiscriminately alluded to as "little *kā'sko*."[2] The woodcock from his favorite scene of operations has earned the name "grass bird,"[3] while the stately bittern has been singled out by Indian name-givers of long ago as the "old pounder,"[4] a name which any ornithologist or hunter would recognize as being exceedingly applicable to the mysterious creature whose voice, from the depth of the swamp, sounds like the chug of a pump-handle. The various lovers are not separated in Indian terminology. They are known collectively as "the long-legged birds,"[5]

[1] (A. O. U. 194) Pen. *kā'sko*, Mal. *kask*^{c}. Casco Bay on the Maine Coast is said by the Indians to have been named because of the abundance of these birds there.

[2] All other herons appearing in the Penobscot country are simply *kā'skis* "little *kā'sko*."

[3] (A. O. U. 228) Pen. *nek*^{cw}*skikwahássis* "little grass bird;" Mal. *nek*^{c}*skwikwessis*.

[4] (A. O. U. 190) Mal. *nok*^{c}*ha'mn*ES "old pounder;" St. Fr. *pokham*ENES.

[5] (A. O. U. 231, 253, 255) Pen. *ktcidja*^{n}*dja*^{n}*wig*A^{n}*'dessu* "big long-long-legged bird;" St. Fr. *sasaso'*.

while the sand-pipers, who have the habit of bobbing up and down while sprinting along the water courses, are grouped under the common "bobbing tail,"[1] rendered also among the English speaking people of the north as "teeter-tail."

There was a time when the forests of Maine abounded with wild pigeons. But the bird is not mentioned in Penobscot fable. In the name of the passenger pigeon, however, we encounter a term, upon which we can build somewhat in imagination. This term in Penobscot is *blEs*,[2] with close variants in the neighboring eastern dialects. Its etymology can hardly be explained, but a related term occurs among all the other Algonkian tribes which is among them the generic term for "bird." Hence by anaology the eastern word for the passenger pigeon is simply, "the bird." To the natives it must have been an important game bird in days gone by.

We may wonder why the northern Indians did not apply this selective name to what really was "the bird," namely the wild turkey. An explanation, however, may be sought for in the knowledge that the northeastern limit of the noble fowl runs across southern Maine and so probably was not a familiar sight to the inhabitants of the Canadian zone. None of the older people even remembers seeing any native representatives of the species. So we have today only the survival of the name, *neheme*, which means "gobbling."[3] Farther south in New England, where the wild turkey formerly abounded, however, we have the Narragansett name in identical form, a piece of evidence which seems to point to a former knowledge of the turkey when it was an inhabitant of southern Maine or when the Penobscot and their allies were resident in a more southern zone.

[1] (A. O. U. 235, 242, 256, 263) Pen. *nenemi'ktcis* "bobbing hind-parts."

[2] (A. O. U. 315) Pen.*blEs*, Mal. *plez*, St. Fr. *pElaz*, Mic. *poli's*. Montagnais *ple'jo* specifies the partridge as does the related Ojibway *binéci* at times, though both imply simply a bird.

[3](A. O. U. 310) Pen. *ne'heme*, St. Fr. *nahama'*; Mal. *ne^c^p* (plural *ne^c^ mi'ik*) Narragansett *neyhom*, (Roger Williams, Key Into the Language of America, R. I. Hist. Society Coll., Vol .1, Prov. 1827, p. 85). The bird was exterminated at an early time in New England, according to historical accounts.

The ruffed grouse, the smaller cousin of the turkey, is still an abundant feature of avian life in the shadowy evergreen forests of the north. If we demand that a bird name like a tale needs a plot if it is to please long and to please many, then we may feel satisfied with the following instance. The Indians are constant hunters of the birds, they love its flavor, and yet their name for it means literally, "the bad bird."[1] I was for some years at a loss to explain this case of misnaming until it was suggested by an old Indian naturalist that since its flesh tasted so good, there ought to be more meat on the bird; finally that the good bird was bad because it was never fat. The grouse is frequently the actor in vulgar fable. He figures as a faithless husband who supplies his family with meat from his thighs instead of obtaining it by the hunt. His wife finally punishes him when she discovers his erring ways and since then the bird's legs have had no meat on them. In another tale the grouse and the muskrat brag about the good flavor of their meat. But the grouse wins the argument by saying, that when he wades across a stream the people who drink the water below can taste the flavor of broth. I have heard Æsop's tale of the fox and the sour grapes repeated in Indian, the grouse taking the part of the bird. The spruce partridge is equally abundant in the same country. His lack of fear is proverbial in the north, though there are few places in Maine where the bird can be taken with a noose on the end of a pole as can actually be done in the more remote parts of Canada. To the Indians the spruce partridge is the bird that "goes branching off to the boughs in his flight," or "the ruffed up bird."[2]

There are four hawks in the country under observation but they are undifferentiated among the Indians. In one tribe of the area the name means "spring bird,"[3] where it is

[1] (A. O. U. 300) Pen. *madjī'ɬessu* "bad bird," Mal. *mEdjīêss.*

[2] (A. O. U. 298c) Pen. *pske' gAⁿdagiɬe* "goes branching off to the trees;" Mal. *saᶜse ge'dagiess* "ruffed up bird;" St. Fr., *pakesso'.*

[3] (A. O. U. 332, 333, 337, 339) Pen., *awe'ɬes;* St. Fr., *sEgwanīɬa'* "spring bird."

also asserted that the hawk kills its prey by a blow from the sharp breast bone when it strikes its victim at the terminus of its descent from the air. The fish hawk[1] has, however, earned a separate appellation. Its name is "great fishing bird," a diagnostic name that is extremely well-deserved.

We now come to the mention of two noble creatures whose forms are occasionally seen swinging in the upper platform of the air, in these northern regions where rabbits, squirrels, and partridges fall victims to their keen beak and keener talons. The golden eagle and the bald eagle are known respectively as the joint kings of birds, the latter passing under the name of "whitehead." In a number of the more serious myths the eagle is mentioned in his regal part. He is probably the bird intended in the famous story, which relates how the principal deity of the Penobscot traveled to the north to find the cause of the tempestuous whirlwinds which were rending the surface of the earth, for the eagle's wings are the source of the four winds which issue from the cardinal points.

To the primitive Indian mind as well as to the mind of the early European, the family of the owls is one of deep portent and fable.

Five distinct specific names are given in these dialects to the five principal owls to be met with in the northern woods. Here is a case of almost complete ornithological classification. The long-eared owl[2] exists under a name which is supposed to convey the sound of its utterance, *dīᶜtʌgli'*. This owl is conceived as giving voice to the following phrase, "*dīᶜ tʌgli' halinskul*" which is a corruption of what sounds to Penobscot ears like, "buckshot." The sonorous exclamations of owls lend themselves to interpretations in almost any language, an opportunity which certainly has not been overlooked by the superstitiously inclined natives of the north. In the barred owl, another imitative name is instanced, "*kokokeho.*"[3] The

[1] (A. O. U. 364) Pen. *izame'gwessu,* "great fishing bird."

[2] (A. O. U. 366) Pen. *ditʌglī'*; Mal. *dīᶜtɛgl.*

[3] (A. O. U. 368) Pen. *kokhokhâssu;* Mal. *kokokhas.*

snowy owl,[1] that beautiful spectre of the north, is regarded as a relative of the barred owl and is known as, "white kokhokeho." One of the actors in mythology is a youth named, "Snowy Owl," whose career furnishes one of the most active and well plotted romances which the Indian mind seems capable of inventing.

The screech owl is a common denizen of northern swamps and the stands of evergreen conifers. His name in all the dialects is derived from the same sound conception "*kamkamess.*"[2] There seems to be no etymological value to this form, but the sound, itself, is possessed of another value which was much appreciated in the old days when war with the Iroquois ruled the land of the Wabanaki. The cry of the screech owl was used as the signal code for warriors hiding in ambush and it still is occasionally used in the same way by hunters who desire to signal one another without alarming the game they are trying to approach. To mock this owl, "as if he were the sacred bird of Minerva forbid the mockery of his dismal ominous cries," is believed to bring on misfortune. For the old people insist on the belief that the screech owl will burn anyone who mocks him by causing his campfire to ignite his clothing or camp effects. Probably the ultimate origin of the warning against imitating owl's cries lies in the fact that the cries serve as signals among warriors and hunters.

The diminutive saw-whet owl, whose diurnal retreat is in the depth of the high balsam groves, seems to share some of the beliefs connected with the preceding bird. Its name is an attempt to reproduce the sounds it utters, "*azaga^{c} 'te.*"[3]

Of the kingfisher, whose native name means "diver for fish,"[4]

[1] (A. O. U. 376) Pen. *wambikokhokhássu.*

[2] (A. O. U. 373) Pen. *kamkámessu;* Mal. *kapkam*Ess. Nuttal, Ornithology, Ed. by M. Chamberlain, Boston, 1897, p. 73, says "cheepomess," the bird of death is Richardson's owl and its sound is a sign of death.

[3] (A. O. U. 372) Pen. *azaga^{c}te;* Mal. *azga^{c}t^{c}.*

[4] (A. O. U. 390) Pen. *kaskama'nessu,* "diver for fish;" Mal. *kaska*A*'mnis;* St. Fr. *tceskwadadás.*

several stories are related, though none is comparable in poetic fancy to Ovid's immortal halcyon tale. In all of them this active bird stands forth signalized by his prowess in diving. There is one tale resembling Æsop's Fable of the "Dining of the Fox and the Stork." Here the actors are the kingfisher and the raccoon. The kingfisher invites the raccoon to dine with him. He obtains fish for dinner by his wonderful diving and spearing. In return the raccoon invites the kingfisher to dine with him the day after. He plunges into the stream as the kingfisher did, and instead of spearing fish he is carried off into the whirlpool and drowns. His guest has to revive him and provide the fish for dinner for his undone host. This type of story represents one which produces a deep appeal to the Indian sense of humor; we may call it the type "tables turned on the host" or "the bungling host." The same motive is repeated in the anecdote of the pileated woodpecker who provides a meal for his guest by picking worms from a dead stump. When they are placed before the guest, they are transformed into luscious roast beavers. When the guest, who again is a raccoon, tries as before to produce a meal in the way he had seen his host do, and ties a bone to his nose, he only succeeds in puncturing his skull in his efforts to drill into the stump, and the woodpecker has to come to the rescue and bring him back to life.

This giant of the woodpecker tribe possesses a name, *meme*,[1] which must be an ancient one among the northern Algonkians, for it is the only name applied among all the northern tribes to the same species of bird throughout. Longfellow has popularized the term in his Hiawatha.

The tribes of the smaller woodpeckers abundantly replenish the burnt areas in the forests of the north. The different species, however, are not recognized in the nomenclature of the Indians, who call them collectively "tree birds," or by a name which means "striking wood," or "pick wood," terms which express the same idea brought out both in the English and

[1] (A. O. U. 405) Pen. *mē'me;* St. Fr. *mama;* Mal. *Amkwátkwat*, "great red head;" Ojibwa, *mē'me.*

the French names for the members of this family.[1] The flicker is separated from the common group by a name which is either an imitation of his call or else derived from an archaic term not now capable of explanation, which contains the root "expert."[2] The smaller cousins of the "pick wood" family, those delightful drab colored climbers, the nuthatches, are designated by the apt and pretty term "going upside down or right side up,"[3] a name which needs no further explanation to those who have watched their happy antics. Still another name is "worm pickers" and, finally, we have a clerical analogy in the name "little priest," a modern name derived from the sober mantle of color which both representatives of the local nuthatches carry as a distinguishing mark.

We now come with impatient interest to the recording of some observations on two birds which have challenged interest in the minds of men all over the world; the whip-poor-will[4] and the nighthawk. There seems to be a touching quality in the notes of the first of these dusk-fliers which calls forth a responsive strain in the mind of the hearer, especially when the weird sentence-like utterance of the whip-poor-will sounds forth in the solitary recesses of the wilderness where all nature is silent. What sounds to our ears like "whip-poor-will" comes to northern Indian senses with the value "wipolessu." Like us the natives assign a meaning to the term, one however, which, on account of its obscenity is unfortunately barred from further discussion. Incidentally, I have often wondered why the Canadian French, who have associated so closely with the Indians for so long and whose superstitious fancy is by no means undeveloped, should have missed the chance of invent-

[1] (A. O. U. 406, 393, 394) Pen. *aba'sessu*, "tree bird;" and *pagama^{c}'kwe* "striking wood;" St. Fr. *o^{n}bâssas;* Mal. *paga^{c}'kwAha* "pick wood."

[2] (A. O. U. 412) Pen. *ta'wa^{n}lotc.*

[3] (A. O. U. 727, 728) Pen. *djigA^{n}lauda'weptus;* Mal. *waha'ntussiskedjik* "worm pickers."

[4] (A. O. U. 417) Pen. *wipo'lessu;* Mal. *wi'pholes;* St. Fr. *pa'poles*, Mic. *wikuīlē'tc.* Nuttal, op. cit. p. 468, gives wecoalis as the Delaware Indian name.

ing a phrase-meaning for the call of this bird. Instead they employ the old French name engoulevent, "gulp the wind,"[1] a name likewise independent of the Plinian name Caprimulgus, "goat sucker," which is in common use for the European representative of the family. Another southern member of this vociferous family of birds has bespoken for himself the name "Chuck Will's widow," a name which carries the tradition of speech faculty from one end of the group to the other.

The nighthawk, like the whip-poor-will, has provided himself in Penobscot with his own name, *pesk*.[2]

These volatile beings, the swallows, whose forms in such countless numbers fill the ample vault of the sky in the north country in summer, are collectively known as "thunder birds," arising from the belief that they serve the thunder as aerial messengers. The name "rain bird" has also become attached to them, for the Indians regard them as the fore-runners of the storm. These names include all five northern swallows,[3] including the chimney swift, except the bank swallow,[4] which has a special name meaning "he has a burrow." The latter deserve special recognition, the Indians say, on account of their colonizing habit. This impels them to excavate their nest burrows in great companies where they honeycomb the high banks of streams in places whence they issue forth towards evening in swarms of thousands, combing the air in their onslaughts upon the assembled multitudes of mosquitoes infesting the sylvan wilderness of the north. The swallows, in short, are truly the birds of summer. They always remind the northern Indian of the story which relates of a time when the world had neither summer nor swallows; when winter's ice and snow were unbroken by the genial period which has been ushered in since the retreat of the glacial age.

[1] "il engoule le vent, (il vole le bec ouvert)."

[2] (A. O. U. 420) Pen. *pesk*^{cw}; Mal. *piktciskwe'ss.* The French Canadians call it *popetué'* for the same reason.

[3] (A. O. U. 423, 612, 613, 614) Pen. *bedagī'ɬessis* "little thunder bird," St. Fr. *sa*^{n}*gloniɬassis* "little rain bird," Mal. *ebe'sskedjis;* Mic. *pugwalic.*

[4] (A. O. U. 616) Mal. *elema'go'ket*, "has a hole;' St. Fr. *pne'gogītassis.*

Another feathered jewel appearing in the north with the glad return of the period of warmth, and one which symbolizes to the Indian eye the floral awakening of nature, is the humming bird, whose Penobscot name *anītàssis*, "the hoverer,"[1] contains the idea of endearment. It is frequently adopted as a personal name for little girls whose tender ways appeal to their fond parents as the humming bird appeals to the flowers and blossoms upon which it depends for life.

In the case of the king bird we have the same characteristic manner of arrogance noted in the name given by both the Indians and the English. He is the "belittler of others," "the scorner."[2] As long ago as the time of Roger Williams the bird was noted among the Narragansett Indians by the name *Sachim* "chief," because of its prince-like courage and command over greater birds.

The jays, those clarion voiced patrolmen of the forest are enriched by many beliefs and ideas. Neither his dashing form nor his blue dress has earned the blue jay his Indian names. It is his voice. Where the English in the early days heard the European bird say, "jay;" the Frenchman heard "pie," but the Penobscot Indian hears "*didias*."[3]

The blue jay has traits of gallantry in Penobscot mythology. He befriended the helpless orphan in several tales and enabled him to become a hero. Nor do the Indians feel the dislike for him that white hunters do on account of his noisy alarm sounded upon first sight of the still-hunter. Probably no bird except the crow is more unpopular among white people in the American woods. The white hunter takes a shot at him to rid the trail of a noisy tatler, while in the civilized region the white ornithologist is undecided on the question of the bird's status in nature economy. To risk a shot, however, at the blue jay the Penobscot believes will bring bad luck to

[1] (A. O. U. 628) Mal. *yalame'ssit* "hoverer;" St. Fr. *nanatàssis*. To the French in Canada this is Oiseau-Mouche, "Bird-Fly."

[2] (A. O. U. 444) Pen. *mesa'ndjessu;* Mal. *messendjess*. The French in Canada use an imitation the kingbird's voice ,"tiritiri" for its name.

[3] (A. O. U. 477) Mal. *titias;* St. Fr. *tidessó;* Mic. *titis*.

his gun. So instead of maligning the bird as an alarmist, he uses him as a spy on the game and circumvents the difficulty by using more caution in approaching the game which has been so betrayed.

The Canada jay, known generally throughout the north as whiskey-jack, is a bird interesting not only to the ornithologist but to the voyager whose journey leads him into the northern forests for instruction as well as pleasure. This bird has gained a reputation as a camp robber, a thief, a meat stealer—all on account of his fearlessness toward man and his consuming appetite in a land where the hunger of no carnivorous bird can ever be satisfied. The whiskey-jack, as we may call him, is known among the Indians south of the St. Lawrence as the "covetous, grabbing bird," as well as by another equally common name, the "offal bird."[1] The appropriateness of the first name is evident, but in the second the only suggestion comes from the fact that the bird is despised by the woodsmen on account of its fondness for camp offal. Its cunning and greed seem to be outstanding traits. Among the Indians north of the St. Lawrence, however, the name *wiskedjak*, from which the English name whiskey-jack has been derived, is the common term applied to the Canada jay from Labrador to the Rockies. A close association has developed between the bird and the hero-trickster of northern mythology, whose name in various dialects is a cognate of *wiskedjak*. Dr. Sapir has called attention to the occurrence of a curious analogy in the history of the French word *renard*, "fox." "This word is not of native Romance stock but is merely a French application of the favorite mediæval trickster Reynard, identified in folk-lore with the fox. The term itself is of Germanic origin and appears in many different forms. Among them are the modern German name Reinhart, and the Dutch and Flemish Reinecke or Reinke."[2]

It is unfortunate, however, from the point of view of the ornithologist that the whiskey-jack's fondness for the

[1] (A. O. U. 484) Pen. *kEskEzégwessu*, and *midjigáni-ɬessu*.

[2] *The Ottawa Naturalist*, Vol. 32, No. 6, 1918, p. 116.

society of man is requited with cruelty. The Indian boys persecute the bold bird with their bows and arrows. It seems a natural archery target for the young hunters. But the white woodsman has refined the practice of cruelty to its extreme. It is no uncommon thing for the men of the lumber camps to bait a pole with a piece of meat and balance it over a log. When the whiskey-jack alights on the meat to tear a piece off, the tormentor strikes the other end of the pole a blow with a club, driving the bird stunned and wounded into the air. The helpless victim is then picked up, plucked bare of feathers and turned loose to enjoy the cold of an arctic winter shorn of his warm plumage.

Interest in the crow can never lag as long as the bird himself is in sight to stir it. When he is out of sight, then imagination supplies the ideas. In various tribal mythologies the crow is believed to have had his color changed from white to black as a punishment for some misdeed.

An Islamic tale relates how the crow was cursed by Mohammed and turned black for betraying the prophet's hiding place by an ill-timed caw. In one of the most ancient Vedas the bird was hurled down through the stories of heaven for carrying abroad the secrets of the gods. The "sullen black incontinent" of the crow in Roman mythology grew out of an act of Æsculapius who changed its color from white as a sign of mourning for his mother, the nymph Coronis.

In America there are several instances where myth explains a similar color transformation. The Ojibwa genesis presents a white crow as the messenger sent out, after the deluge, to seek for signs of land. The white bird is told not to eat before returning with his report. He disobeys and becomes black out of punishment. To the Indians throughout America the crow is involved with religious feeling. Among the Penobscot he is the bringer of the first corn to the human race. He is the messenger of the mythical culture-hero, and again his antagonist when the hero tries to escape from a pursuing Cyclops. The crow is an actor of many parts in Algonkian. He is assigned a profound intelligence which he no doubt deserves

and is believed to observe a form of social control out of which arise the assemblies and councils which have been so often reported to take place in the crow kingdom. The French Canadian settlers call these gatherings "noces de corneilles," "crow weddings" by an inferior process of thought. In the crow's name we behold another universal resemblance in sound perception; classical *corax* and *corvus;* English *crow* and its cognates as well as all the Indian names in the area we are considering, such as *mkásEs*, *kágos*, reproduce the corvine sonant.[1] Yet there has been a sound convergence as well for the term also is a relative of that for "black."

That sable monster, the raven, with his deep voice, has called forth an Indian name which, like that of the crow, is onomatopœic, *gagago*.[2] He often shares in Indian mythology the scene of action with the crow.

The bobolink bears a descriptive name, "white-back" while in one of the other eastern dialects it is the "pond blackbird."[3] That gallant spring songster, the red-winged blackbird which the French have so appropriately denoted "l'officier" for possessing his red epaulets, is, however, among the Penobscot named for his voice, "*tc*E*gw*E*l*E*sk*."[4] The bronzed grackle which annually arrives from the west in waves which settle down all over northern New England and Canada is called by the Indians "fearsome bird."[5] This name seems correctly applied to the grackle which in the north is quite shy and restless near man. The catbird when referred at all to is called by the same name, though it is rarely seen in the forests of northern Maine.

We now come to record native observations on that interesting group, the finches, large numbers of which breed in the

[1] (A. O. U. 488) Pen. *mkâs*E*s* "black-old;" Mal. *kákac gos;* St. Fr. *mkázas*, Mic. *kakagutc.*

[2] (A. O. U. 486) Pen. *ktci gágago* "big *gagago;*" St. Fr. *ktcimkásas* "big crow."

[3] (A. O. U. 494) Pen. *wa*^{n} *bipskwanac sit;* St. Fr. *n*E*b*E*sitcól*E*sk*^{c} "pond blackbird."

[4] (A. O. U. 498).

[5] (A. O. U. 511b and 704) Pen. *djibai-ɬessu;* Mal. *tc*E*gw*E*l*E*s'sk*^{c}.

north, enlivening the woods with their song. The goldfinch appeals to the Indians as the "cunning, shy bird,"[1] while another name, "the yellow bird," is applied to him as well as to the yellow warbler. The chipping sparrow and his allies have earned a name which indicates their fondness for man's proximity, "little garden bird."[2] These are agrarian creatures who evidently from early times have continued showing their fondness for the cleared spaces near Indian camps. The song sparrow, to my mind, possesses the prettiest sounding name that we meet with in northern Indian bird names, "*sulsulsui.*"[3] This is the sound representation of what the friendly song sparrow calls forth to man in the early days of spring. Though many ornithologists have tried to render the tuneful lay of the song sparrow into word form, it can hardly be said that enough agreement exists among the forms given to make any of them more worthy of consideration than the others. There seems to be some attempt to distinguish between the song sparrow and the sweet-voiced white-throated sparrow whose tender whistle resounds so frequently from the evergreen thickets everywhere in the Canadian zone. The latter when distinctly referred to seems to be designated as the "big chickadee,"[4] although in the nomenclature of most of the Indians the two birds are confounded.

Our winter friends, the snowflake and the snowbird or junco, have challenged enough attention from the northern natives to receive appropriate names. The former appears as "little white goose"[5] from the resemblance of this small bird to the Canada goose, a resemblance which lies mostly in the similarity of breast color. The junco, met with everywhere in the forests, is generally a more or less solitary bird in the summer. Two

[1] (A. O. U. 529) Pen. *si'ɬEwis;* Mal. *wizawie'ssis* (also A. O. U. 652a).

[2] (A. O. U. 540, 581, 585) Pen. *ki^{c}'kAniɬessis;* Mal. *ki^{c}kAnie'ssis.*

[3] (A. O. U. 581) Mal. *sulsulsu'li;* St. Fr. *kaskaldja's.*

[4] (A. O. U. 558) Pen. *ktcigīgīɬa'ssis.* Possibly the Malecite name of the preceding belongs properly to this species.

[5] (A. O. U. 534) Pen. and Mal. *wa^{n}bīgīɬa'k^{cw}sis;* Mal. also *waste'wīessis*, little snow bird.

composite names are applied to this bird but they do not lend themselves to explanation except in respect to one element which seems to refer to "bubbling,"[1] or "bouncing."

The prettiest concept of all is expressed in the Penobscot name for the redstart.[2] It is called *skwudés* "little fire" or "flamelet." A rather remarkable coincidence is presented in the fact that the same beautiful bird has received from the natives of Cuba the name "el candelita," the "little candle," "who flashes his brilliant salmon flame and black feathers." The habit of spasmodically displaying its flashing brilliancy has impressed the Indians of the north as well as the natives of Cuba in the same way that the oriole did Holmes, "floating like a flake of fire."

The very applicable Cuban name seems to have been first introduced into bird literature by Neltje Blanchan in one of her books and this interesting note together with her remark on the name Mariposas "butterflies," applied in Cuba to the warblers in general, has been repeated in the pages of several bird books without credit to the source. Such attractive data, however, as the poetry of names and their allegories might well be promulgated even if the pioneers of knowledge are ignored. We need not hesitate to complain against the indifference of even most of our best bird essayists in this respect.

There is, however, one observation which truth compels me to make as disagreeable as the contemplation of it is. Coming from out the past there is a cruel tradition. When, near the savage camp a bird mounted upon some swaying twig and poured forth his melody it was regarded as an omen of sickness and death. Yet if the happy creature could be killed or wounded the curse would be annulled. The feeble beak was torn apart and the throat so lately palpitating with joyous song, was spat into, *kedAzī°tA'nona* "he is causing sickness and death," muttered the avenger. Children too, were often applauded for their attacks upon captive birds and animals, those which had fallen victims to their ready bows and arrows.

[1] (A. O. U. 567) Pen. *abesska'djEssis;* Mal. *po°kEzna'wessis.*

[2] (A. O. U. 687) Pen. and Mal. *skwudés.*

They were trained by this example of cruelty how to treat their human foes in the battles of manhood. And yet with mediæval hospitality children were taught to protect the bird guest that ventured to enter the camp door. The host then became the protector in the belief that the bird was a spirit visitor and the bringer of good fortune. If harm should befall the creature the sacrilege would be avenged by the bird's outraged kin and game animals would never allow the hunter to approach.

Among the few name similes that we encounter in a review of Indian bird names in the north, that of the cedar-bird, or cedar-waxwing, affords an interesting case of analogy. To many peoples in the New World the appearance of the cedar-bird has called forth the same response, providing for it a name derived from the prominence of its crest or topknot. The northern Indians know the cedar-bird as "Mohawk hair-cut"[1] from the resemblance of the bird's crest to the ancient Mohawk style of "roaching" the hair by shaving off all but the dorsal crest. This method of hair dressing contrasted greatly with that of the Algonkian tribes who ordinarily allowed the hair to grow long or braided it. Like the Turks in Asia the Mohawks were consequently known as the warriors who wore the hair-crest and so the cedar-bird has come to be regarded as a reminder of the age of warfare with the Iroquois. We find appellations based upon the topknot current among the Canadian French who call the bird Récollet, and in the south where the name Crown Bird was applied by English observers who noticed the peculiarity as the Indians did.[2]

The great family of northern warblers receives little attention from Indian observers. It constitutes the group of denizens of the leafy vasts which the natives know so well but which do not challenge special attention. They pass

[1] (A. O. U. 619) Pen. *megwaimoᶜ'sumaᶜsit;* Mal. *megwī'muzmaᶜsit.*

[2] Still more information of interest concerning bird names is given by Dr. Spencer Trotter in an article entitled "An Inquiry into the History of the Current English Names of North American Birds," *The Auk*, Vol. 26, No. 4, 1909, page 358.

under the generic name "small birds."[1] Only one, the black and white warbler has called forth separate mention and he, too is confounded with the nuthatches in the name "little priest,"[2] bestowed on account of his light and drab cloak.

As one travels in the shades of the northern forests he soon learns to expect the company of the vocal and joyous chickadee whose eyes are ever watchful for the woodsman's campfire smoke telling him that near by is man, and that refuse from the camp meal may be had before long. The friendly habit of the chickadee has appealed to the imagination of Indian myth makers, for he appears in narrative as the helper of the culture-hero at the moment when the giant monster, White Bear, was about to overcome him. The Indian Achilles had expended all but one arrow in a futile attempt to pierce the heart of the monster, when the chickadee alighted upon his shoulder and whispered in his ear that the heart of the great White Bear really lay in his heel. The hero shot his last arrow at White Bear's heel and killed him, ridding the world of the monster which had been preying on mankind. The chickadee continues to chant his little lay which says "*ktcīgīgīł âssis.*"[3] His plaintive and friendly voice awakens in the mind of the traveling hunter the truth of the native belief in the friendly and helpful nature of this sweet bird.

The three thrushes of Maine are known by the same name, "bird of evening," "evening caller."[4] Undoubtedly that most incomparable singer, the hermit thrush with his clarinetist voice is meant, for this is the most noteworthy among the birds of the Penobscot country, the one that im-

[1] Pen. *sī'psis* denotes in general any small insignificant birds. This is the independent substantive. In composition, however, a secondary, inseparable element is required, Pen.—*łessu* (—*łessis*, dimin.) Mal.—*ess* (—*essis*, dimin.).

[2] (A. O. U. 636) Pen. *patlias*, "priest" from Eng. "father."

[3] (A. O. U. 735) Pen. and Mal.

[4] (A. O. U. 755, 756, 759*b*) Pen. *alAngwe'wEdEm* "evening caller;" St. Fr. *wlon'gwīłas*, "evening bird." The St. Francis Abenaki apply this name evidently to the cuckoo which in the north frequently utters his call at night.

presses itself most strongly on the attention of the woodsman whether he be white or Indian. No one who travels in the country of the northern Indians fails to experience the feelings of calm and peace with the world which are stirred when the hermit's seraphic music fills the etherial sky.

Among the birds that spring invites to the northern climates, one of the most common and conspicuous is the robin.[1] I have seen one on a snowy bald as early as the 16th of April. In Canada the "red breasted thrush" of both English and French is well known for the legend of the cross which all the poets except George Sand have overlooked. Lemoine traces the fable back to the Bretons. The European belief that the red breast is the agent of supernatural power and the carrier of good messages from spirits, so nicely related by Toussenel, is not carried over particularly to the American robin although the bird is greatly loved by the settlers in the Laurentian forests. As far north as one goes in the timber country he will meet the robin, though not in numbers. Now and then the call note so familar to the inhabitant of warmer climates will be heard amid the spruce and fir growths of the Canadian zone to remind him of the distant lilac bushes, lawns and maple trees that form so conspicuous a feature of his home landscape. The bird's alarm call has earned him the names, *gwīcgwīc*, and *wīᶜkwu'skessu*, and the latter has been modified by a rationalizing tendency, into the term which can be translated as "he draws his wings close when flying."

A group of interesting birds of whom, however, nothing more can be given from the Indian point of view than their names, includes, the bluebird, called "blue-tinted,"[2] the pine grosbeak, "bough-picker,"[3] the crossbill, "crooked-nosed bough-picker," and[4] the linnet and the purple finch which are

[1] (A. O. U. 761) Pen. *wiᶜkwu'skessu* "draws his wings close together, when flying;" St. Fr. *kwi'kweskás;* Mal. *ankwī'bzhess.* The Ojibwa of Ontario have the name *gwīcgwīc*, a derivation of the bird's alarm note. I believe that all these forms are etymologically related.

[2] (A. O. U. 766) Pen. *kaᶜkaseᶜ'kwatsit.*

[3] (A. O. U. 515) Mal. *amunhaduk.*

[4] (A. O. U. 521) Mal. *pemskwīᶜgnat amunhádukk.*

ranked together under the name "red one."[1] Lastly, and to a certain extent, least, the winter wren is recognized under the name "little under-hiding bird"[2] from his habit of darting under piles of brush.

It has become apparent that in all the northeastern Algonkian dialects, avian forms are definitely classified in their proper grouping under the term *sips*, "bird (in general)" undoubtedly of onomatopœic origin. The generic term, however, includes one unauthorized member, the bat, in Indian fable the modern survivor of the "toothed birds of North America." All the northern Indians classify this mammal with the birds, applying to him different forms of the term meaning "fur-hide bird."[3] According to the native theory of evolution, human beings of the mythical age metamorphosed back into the lower forms of life as often as they did forward from animal to human form. There is a tale of the primeval transformation. Two old women, became changed into bats; two blind widowed comrades, who were continually fighting with each other, using for the purpose their sharpened elbow bones which, as the natives point out, still survive in the bat in the shape of the clawed digit.

Aside from the birds of reality, whose recitation has until now engaged our attention, there exist those winged creatures of fancy, the actors in myth and legend unlike anything revealed to modern mortal eye. They are, however, none the less real to the credulous natives of the sub-Arctic regions in whose wild fastnesses and gloomy recesses in summer, and over whose snowy vasts in winter prowl the forms of creatures born of imagination affected by solitude, cold, hunger and fear. Some of these beings assume avian shapes. There is weird

[1] (A. O. U. 528, 517) Mal. *me^{c}kwī'git.* The identity of birds and names is very uncertain in these cases.

[2] (A. O. U. 722) Pen. *alAm-tabīkEssis.*

[3] Pen. and Mal. *mEdégEni-tessu.* A similar difficulty, even worse handled from the point of view of observation, seems to have confronted the Chinese in classifying the flying squirrel which by them is likewise included among the birds. (Cf. S. W. Williams, *The Middle Kingdom*, New York, 1904, Vol. I, p. 327.)

Pemule, a creature with paddles in the form of bull-roarers for wings and whose voice is like a high whistle. He comes buzzing his way every seven years from the east, coursing past the zenith to disappear on the western horizon. He utters one note when he rises from the eastern horizon, another at the zenith, and another at the point of sunset. If the people in any way desire help of Pemule they are to build a fire so that the smoke will rise at noontime and signal him to descend when he arrives and utters his cry at the zenith. Whereupon Pemule, bird, insect or whatever he is, will, it is believed, descend and free the people from their oppressing troubles.[1]

The great compelling world winds are believed to be maintained by the flapping of the wings of the monster bird which resides perched upon a high peak near the northern edge of the world. Once in the mythical age of transformation the tempest raised by the wind bird waxed unbearable to life. The tearing currents impelled by his flapping winds uprooted forests and turned the surface of the sea into driving spray. It then became necessary for the legendary culture-hero to betray the bird monster into his hands and partially disable him to prevent the recurrence of his manifestation of power. Versions of this poetical fancy are recorded in great detail and with complex by-plays from the Ojibwa of western Ontario through to the Wabanaki on the Atlantic coast. The epic, on the whole, affords an example of one of the finest productions of Algonkian literary composition.

Another bird known as the "wampum bird" appears in story. The creature was the pet of the mythical hero. On alternate mornings this "goose that laid the golden egg," as it were, rustled its feathers and shook down a shower of white and black wampum beads for its master.

We may now at the last lend ourselves to the enjoyment of

[1] Pemule literally means "coming flying and paddling" in Penobscot, St. Fr. *Pamolá*. The creature moves through the air by twirling a bull-roarer in each hand like a propeller. Bull-roarers are of wide distribution in the primitive world from Australia to the American Indians. They are generally conceived as reproducing the voices of spirits.

a further discovery in the Indian natural history of birds. It is the belief, general among the Canadian tribes, that the small birds arriving in the north with the spring tide of migration ride upon the backs of wild geese or loons, and return to the south by the same accommodating means in the fall. This curious belief is of considerable ornithological interest, in view of its remote possibility of partial truth. The belief finds a wide distribution in both the old world and the new. It is reported, as we shall mention in a moment, from a number of European sources and has recently attracted my attention among the Algonkian tribes from Newfoundland westward through Ontario. And the information coming from published sources carries it through almost to the Rockies. Several naturalists of modern as well as ancient times have indicated a certain credulity toward the fable. The Indians are assured of its truth, but their assurance in this case is about the same as their certainty of the truth of the story that the wonga-wonga bird provisions herself by laying half a dozen eggs and eating them. There are those among the Penobscot and Malecite who claim to have seen the small birds alight from the backs of geese when about to settle upon the surface of a lake to rest after a long flight. The Micmac of Nova Scotia also relate the same thing, adding that the Canada goose brings the robin from the south, that the birds ride beneath the wing-pits; that the geese also bring the flies of summer tucked beneath their plumage.[1] For all stories of this sort the Indians can point to actual hunters who have with their own eyes seen the thing performed. From one of the articles to be quoted in a moment we learn that the Cree Indians at Moose and York Factories, and the Athabascans from the Great Slave Lakes to the Mackenzie river tell the same stories.

European naturalists have not been far behind the aborigines in their profession of faith in this fable. Dr. George Bird Grinnell in a recent publication says, "A great many years ago

[1] Similarly the salmon are thought to bring the alewives and minnows, leading them from the sea and sheltering them by their fins.

Dr. J. C. Merrill published in an ornithological journal an account of the Cranesback, a small bird with short bill and rounded wings which the Crow Indians had told him were carried on the backs of the sandhill cranes in their migration. Dr. Merrill did not see this small bird yet from the description given by the Crows, conjectured that it might be the pied-billed grebe." Dr. Grinnell goes on by saying, "No doubt, however, it is the Carolina rail which the Blackfoot Indians (of Montana) say the cranes transport on their backs north and south."[1] Dr. Grinnell appears to believe this item of Indian ornithology. He is in good company in the matter for Buffon[2] (1801) stated that the corncrake migrated to the south on the back of the crane, and Pallas, who traveled in Russia in 1793, repeated a similar statement. Now we also have an interesting article by a well-known British naturalist, Dr. J. E. Harting, who wrote, in Forest and Stream in 1888,[3] an interesting essay bringing together a number of references bearing upon the truth of the thing attested to by witnesses of several nationalities during their travels in Europe, Asia, Africa and America.[4]

"At a recent meeting of the Linnean Society, Dr. John Rae, the well known Arctic traveler, read a paper relating to the birds and mammals of the Hudson's Bay Territories, and in the course of his remarks referred to the assertion of the Cree Indians, both at Moose and York Factory, that a small passerine bird, which was pointed out to him, but the name of which he has forgotten, habitually avails itself of the Canada goose when migrating to get a lift in the same direction, they having frequently seen it fly off from a goose when shot, or shot at, on the wing. All the coast Indians of Hudson's Bay, says Dr. Rae, devote a month or more every spring to shooting wildfowl (chiefly geese), the birds killed forming their entire food for the time. As soon as the geese begin to arrive, the Indian constructs a concealment of willows and grass, usually near a pool

[1] Bulletin of the American Game Protective Association, New York, Vol. 6, No. 1, Feb. 1, 1917, p. 10.

[2] Histoire Naturelle etc., Oiseaux. VIII, p. 150, and Pallas, Zoogr.

[3] Forest and Stream, Apr. 26, 1888, The Cranesback, quoting in full an article in London Field by J. E. Harting.

[4] I am indebted to Mr. B. H. Swales of the National Museum for tracing this matter for me and securing the issue containing the article.

of open water, at the edge of which he sets up decoys. When geese are seen approaching, usually flying at a great height, the Indian imitates their call, and the geese, on seeing the decoys, circle round, gradually coming lower down until within shot, when they are fired at. It is from these high flying geese that the small birds are seen to come. If the geese are flying low it is a pretty sure indication that they have already rested on the ground, somewhere near, after their long flight, when of course their tiny passengers would have alighted. The Indians on the shores of Athabasca and Great Slave Lakes—both great resorts of wild geese—and those living on the Mackenzie River, more than 1,000 miles to the northwest of Moose Factory, tell the same story, and from the positive statements which were made to him on the subject Dr. Rae saw no reason to doubt the assertion. So far as he could ascertain, the Canada goose is the only species in North America which thus acts the part of a locomotive, and conveys small passengers from place to place; but in Europe and Africa the common crane and the stork have on every respectable authority been credited with performing a similar friendly office.

"Dr. Lennep, in his 'Bible Customs in Bible Lands,' refers to the many small birds which find their way from Palestine into Arabia and Egypt on the backs of cranes, over lofty mountains and sea, which without such aid it would be difficult to cross. In the autumn flocks of cranes are seen coming from the north with the first cold blast from that quarter, flying low, and uttering peculiar cries as they circle over the cultivated plains. Little birds of different species may then be seen flying up to them, while the twittering of those already comfortably settled upon their backs may be distinctly heard. On their return in spring they fly high, perhaps considering that their little passengers can easily find their way down to the earth.

"In some instances, however, the small birds have been seen to come off the backs of the larger ones, just as the latter were about to alight. An American visitor to the Island of Crete in the autumn of 1878, as related by Professor Claypole, of Antioch College, Yellow Springs, Ohio (*Nature*, Feb. 24, 1881) satisfied himself that wagtails and other small birds cross over from Europe on their southward migration on the backs of cranes; and although on first hearing the statements made, he was extremely incredulous, he afterward, on one occasion, had ocular demonstration of the fact. A fisherman in his presence disharging his flint-lock at a flock of passing cranes, he saw three small birds rise up from among them, and disappear.

"A German author, Adolf Ebeling, writing in the *Gartenlaube*, asserts that he found it currently believed at Cairo that wagtails and other small birds cross from Europe to Nubia and Abyssinia on the backs of storks and cranes, and details the result of conversations which he had with several independent witnesses, all testifying to the same thing. He then

proceeds: 'At supper, in the Hotel du Nil, Ir elated the curious story to all present, but, naturally enough, found only unbelieving ears. The only one who did not laugh was the Privy-councillor von Heuglin, the famous African traveler, and, excepting Brehm, the most celebrated authority of our time on the birds of Africa.' On asking his opinion, he remarked, 'Let others laugh, they know nothing about it. I do not laugh, for the thing is well known to me. I should have made mention of it in my work, if I had had any personal proof to justify it. I consider the case probable, though I cannot give any warrant for it.' 'My discovery, if I may so call it (continues Herr Ebeling) I would have kept to myself, even after Heuglin had thus expressed himself, had I not since discovered a new authority for it. In the second edition of Dr. Petermann's great book of travels I find the following: 'Prof. Roth, of Munich, related to me, in Jerusalem, that the well-known Swedish traveler, Hedenborg, made an interesting observation on the island of Rhodes, where he was staying. In the autumn, when the storks came in flocks over the sea to Rhodes, he often heard the notes of small birds, without being able to see them; but on one occasion he observed a party of storks just as they alighted, and saw several small birds come off their backs, having been thus evidently transported by them across the sea.'

"In the face of such testimony, then, as that above mentioned, and the admission of his belief in the story by so experienced an ornithologist as Heuglin, the conclusion seems inevitable that there must be some truth in it, and it has received some confirmation from a singular observation since made in England. Mr. T. H. Nelson, of Redcar, writing to the *Zoölogist* for February, 1882 (p. 73), reports an occurrence related to him by an eye witness, Mr. Wilson, the foreman on the South Gare Breakwater, at the mouth of the Tees, which bears directly on the question at issue.

"On the morning of Oct. 16, fine and cold, wind northerly, Wilson was at the end of the Gare, when he saw a 'woodcock owl' (short-eared owl) 'come flopping across the sea.' As it came nearer he saw something between its shoulders, and wondered what it could be. The owl came and lit on the gearing within 10 yd. of where he was standing, and directly it came down a little bird dropped off its back and flew along the Gare. He signalled for a gun, but the owl saw him move, and flew off. He followed the small bird, however, and secured it, and on taking it to the local bird-stuffer for preservation, learned that it was a golden-crested wren. To see its irregular, and apparently weak, flight in passing through the air on a stormy day, it would never be supposed that so tiny a creature as the golden-crested wren would attempt to cross the sea, or would succeed in doing so if it tried. But that it travels to and from the Continent in spring and autumn is a fact which has been well ascertained by many competent observers. On the coasts of Yorkshire and Lincoln-

shire, says Mr. Cordeaux, the autumnal migration of the gold crest is as well known as that of the woodcock, and from its usually arriving just before that species, it is known as the 'woodcock pilot.' The North Sea fishermen assert that these little birds often alight on their boats, an in foggy weather perish by hundreds. The same thing has been observed by Mr. E. T. Booth off the coast of Norfolk. There is, then, nothing so improbable as might at first sight appear in a gold-crest crossing the North Sea and alighting tired on the broad platform afforded by the expansive back and wings of a short-eared owl traveling at slower speed beneath it. At any rate, the fact remains that the gold-crest was seen to descend from the owl's back when the latter alighted, and its identity was placed beyond doubt by its subsequent capture. There is, verily, in heaven and earth much that is still undreamed of in our philosophy."

"J. E. Harting."

Among the others of the Old World, who have discussed this belief among the primitive and ancient inhabitants of Asia and Europe, is Newton, whose remarks are worth quoting on the side of skepticism in respect to the possible truth of the belief.

"Of the same kind is the equally ancient belief that little birds get themselves conveyed from one country to another by their bigger brethern. Storks and cranes on their migration are manifest to beholders, but the transit of lesser birds of feebler flight is seldom evident, and when, as often happens, large and small birds disappear or arrive simultaneously, what is more natural than that the ignorant should suppose that the latter avail themselves of the former as a vehicle? Thus is 1740 the Tartars of Krasnojarsk, and the Assanians assured J. G. Gmelin (Reise durch sibirien, 3, pages 393, 394) that when autumn came each Crane took a Corncrake on its back and transported it to a warmer land, while the well-known belief of the Egyptian peasant that Cranes and Storks bring a living load was not long since gravely promulgated in this country as a truth."[1]

A strange fallacy regarding the seasonal movement of swallows seems to have engaged the speculation of primitive north Europeans and even of such eminent naturalists as Olaus Magnus, Bishop of Upsala, in 1669 and Gilbert White in 1776. They entertained the belief that swallows hibernated beneath the mud of ponds and lakes and emerged again in the spring. Even Cuvier in 1835 did not contradict this curious fable.

[1] Newton, Dictionary of Birds, page 550.

Unlike the cosmopolitan idea we have just discussed this particular belief seems to be restricted to the inhabitants of the northern parts of Europe. Pliny did not record it in the Mediterranean region. I never could discover its correspondent anywhere among the American Indians. They evidently observed the passage of birds with more accuracy, if we forget for a moment their legend of the small birds migration on the backs of geese.

On the whole the impressions one gets from the naming of birds and animals and the fables associated with them are often extremely pleasing.

We have discovered that the system of bird, naming among the northern aborigines seems to follow two lines. About one-third of the 72 native birds named and identified are named from their utterances. The rest of the names are of a figurative and descriptive origin.

Errors have of course been absolutely unavoidable in getting this list and the notes together. One of the chief causes, however, has been the uncertainty in the minds of the informants themselves as to the differentiation among birds that look alike to the naked eye. Again I found that informants did not always agree upon the names applied to birds even after they had settled the identity to their satisfaction. In the matter of onomatopœic names the birds seem to be somewhat more critically identified. Those who have attempted to interpret the songs of birds according to the European ear will find that the Indian names so derived are fully as diverse as are the song renderings given by ornithologists.

GOING TO CHURCH IN ANCIENT ROME

By George D. Hadzsits

Assistant Professor of Latin

"Going to Church in Ancient Rome" is a sufficiently ambiguous title to satisfy the most sophisticated craving for the paradoxical. But it is not merely your amused distraction that this title aims at,—for, on the contrary, it is meant to convey something of the profound contradictions inherent in a religious system that scarce required attendance at church at all. To the orthodox Roman believer there could be little question about the validity of his dogmatic faith in the existence of God. There could be little doubt as to his certain knowledge regarding the habitat of God. The only disturbing factor was how to retain the good will of gods, for despair followed upon such uncertainty. A world without God was unthinkable; a world without his favor became a mad dream. Religion was interpreted in terms of union and unity with divine dispensation, through ritual.

The when, the where and the why of Roman religious practices may well engage our attention for a brief hour, as we seek to catch the true spirit of religious institutions vitally affecting the lives of a great people for a thousand years and more. Temples, priests and gods there were, and I would conduct you into some of the rich associations of time, of legend and of history in order that we may comprehend the validity of applying to an ancient Roman, the dictum of a recent, great contemporary: "Without God, the bottom drops out of everything." To be sure, mountebanks were not lacking, of course skeptics scoffed, but the history of orthodox Roman religious practice is an epic in human religious experience, filled with deep and heroic emotions, an epoch that has not yet closed. The spirit of Roman worship

has survived the decay of temples and the fall of palaces and will continue to live. When the waters of Lethe pour over human experience, then the end may come to the influence of ancient Rome's religious beliefs and observances. It is to a consideration of the status of the marvellous institution as it existed when Rome was mistress of the world that I would invite your attention at this time.

After years of worship in public at state altars, set up on the hills and in the valleys, the Romans finally, in the time of Servius Tullius, erected the first temple in the city. Near the close of the regal period, Diana was thus worshipped on the Aventine. To Jupiter Optimus Maximus on the Capitoline was erected a temple that in time became one of the greatest centers of worship not only in Roman religious history but in the religious history of the world. Constructed originally of the native tufa of the hill, this temple increased in splendor with the years, sheltering statues of Jupiter, Juno and Minerva, having Corinthian columns, a pediment surmounted by a quadriga and a roof covered with gilt bronze. It contained works of art of all descriptions, its ceiling was gilded and a mosaic pavement was laid in the cella. The central chamber contained Jupiter's statue, represented as a triumphant general.

This Etruscan temple became a symbol of Rome to the mind of Horace, just as, long before, the incorporation of the cult of Terminus, the god of boundaries, in the temple was regarded as prophetic of the permanence of the cult and of Rome itself. "Provided a long stretch of sea rolls between Ilium and Rome, let the exiles rule contented whereso'er they will.

Provided the cattle gambol over the tomb of Priam and of Paris, provided the wild beasts hide their whelps, unhunted,

On that condition, let the Capitoline rise refulgent and stern Rome give laws to the conquered Medes."

It was to the Capitoline that Ovid, too, instinctively turned, when the order to leave Rome quite crushed his spirit.

"And now the cries of men were hushed and the baying

of dogs was stilled. The moon on high led forth her steeds of night. I gazed up at her and by her light beheld the Capitolia which were near my Lares but alas availed me naught. 'O ye gods who in these seats do dwell,' I exclaimed, 'O temples which my eyes may ne'er again behold, O gods whom I must leave, whom Quirinus' lofty city cherishes, Hail, and now farewell, forever.'" This temple was the center of worship of Jupiter, the Greatest and the Best, and the credulous must have repeated with satisfaction the legend that the head of a man, with the face entire, had appeared to the workmen when digging the foundations of the temple. The sight of this phenomenon unequivocally presaged that the city should be the metropolis of the Empire and the head of the world, as soothsayers had predicted. The temple presided over the hills with majestic serenity, lacking the grace and artistic qualities that rendered the Parthenon unique in the world's religious architecture, but possessing the grim, ponderous stability of Etruria and the calm, unshaken determination of the Roman of old. According to tradition, "Scipio was wont to ascend to the temple just before daylight, to order the *cella Iovis* to be opened for him and there to remain alone for a long time, as if taking counsel with the god about the affairs of the State. The dogs, it was said, which guarded the entrance, astonished the temple-keepers by treating him always with respect, while they would attack or bark at others." It may be that the conqueror of Hannibal, in communion with the god drew near to his divinity and felt a share in his power; at any rate the notion began to prevail that Scipio was of divine extraction.

Roman temples were, as a rule, raised on high podia, and the number of these, erected to the gods of the state or dedicated by individuals in consequence of special occasions, in time crowded the city which was full of places of worship. Here the appointed priests conducted the service with or without the presence of others, as ordained by state-law. For such a thing as congregational worship was not required by the spirit of Roman religious administration. Copied after the ritual of

the home and the worship of the fields, the state organization of religion took over for the people the worship of the state on behalf of the state and its dependents.

So there was the state worship of Vesta, in charge of the sisterhood of Vestals, conducted in the little shrine in the Forum. This cult was copied after the worship in the home, while the temple was modeled after the form of the primitive hut. At this state-hearth the cult continued one of the most important into the latest times of the Empire, even after the victory of Christianity, since it was not till 394 A. D. that Theodosius closed the temple, which in the 8th and 9th centuries was in a state of ruins. It was not till the 19th century that excavations and further study have revealed to us the true site and the manner of construction of this holiest of holies. This temple, containing no statue of the goddess, guarded the mysterious symbols and pledges of the power of Rome, especially the Palladium which Aeneas was thought to have rescued from the burning city of Troy. No man, with the exception of the pontifex maximus, was allowed to enter the temple and on the first day of March (the New Year's Day of the oldest Roman year) the Vestals renewed the sacred fire. Built, at first, of reeds with a straw roof, later the temple rose upon a circular substructure and was constructed of stone, with marble veneer, surrounded with columns; these supported an entablature, the frieze of which was decorated with sacrificial instruments and the insignia of the priests. It was one of the few round temples in Rome, which expressed a preference for the oblong form such as we see repeated, over and again, in temples of the Republic and of the Empire. Moralists and satirists of the first century B. C. regretted the passing of earlier simplicity in religious architecture and in religious ritual, but neither the protests of Sallust nor of Ovid availed against the tendency to house the gods in homes thought to be worthy of their divinity and the city they represented.

In the 4th century B. C., to commemorate the close of the long struggle between patricians and plebeians a grateful

people erected the temple of Concord, but peculiar local conditions resulted in a structure unique among Roman temples, for it was almost twice as wide as it was deep. Containing a statue of Concord, this temple glittered with marbles within and without and became a museum of works of art of all kinds. Built up against the slopes of the Capitoline, the temple of Concord was adjacent to an institution, one of gloomy history, the Mammertine prison. It overlooked the Forum which, with many another record in concrete and stone of political history, contained, besides, a wealth of religious associations in temples to gods of greatest antiquity and shrines erected to the later principle of human deification. It has often been said that the Romans lacked religion, that all of the pomp and ceremony of religious institutional worship crowded out of the Roman conscience a genuine feeling of devotion to god, a religious sense of dependence, or of unity with divine will. The continuance of religious ceremonies in the home, however, kept alive a genuine religious instinct and this was fortified by the greatness of Rome's public ceremonials during the days of her power, enhanced until the days of decline and decay by the glamor of a ritual of unparalleled splendor.

That besides the worship of abstractions of *Honor* and *Virtus* there should have been a temple to Mars the Avenger need occasion no surprise when one reflects upon the nature of public Roman prayers which invoked pestilence and destruction upon the foe, with the assumption that justice ever perched upon the standard of the Roman legion and that gods forsooth must side with the divinely appointed race. Now a ruin, this temple which owed its origin to the assassination of Caesar, was praised by Pliny as one of the most beautiful and perfect works of man ever seen on earth. Great pieces of timber from the Rhætian Alps contributed to the strength of the roof, while fluted marble columns, nigh 50 feet in height and graced with Corinthian capitals, added to the beauty of the structure; while among the treasures it contained were an ivory statue of Apollo, pictures of battles and of triumphs, one of these representing a victory of Alexander the Great.

"The temple also contained safes and strong boxes where large sums belonging to private citizens were kept under the guarantee of the priests. A daring robbery, perpetrated toward the end of the 1st century, when even the precious helmet was wrenched from the head of Mars Ultor, frightened the depositors so that the priests gave up banking, at least for the time."

Very different was the temple of Magna Mater whose cult, introduced from abroad and established on the Palatine in 204 B. C., marked the collapse of the older religion which needed the supplement of cults from across the seas. Brought to Rome in great state, the ship that conveyed the goddess' symbol of a sacred stone, refused to make headway against the stream until Claudia Quinta miraculously loosened the bark so that the goddess could proceed to the city. There the rejoicing attendants of senators and of matrons were received by Scipio and in due course the cult was established that brought into Roman religion an element of unrestrained emotion hitherto unknown in the pagan city. Wild barbarity characterized the worship of the Great Mother, sensuous musical strains inspired a religious frenzy, the procession that accompanied the chariot of the goddess was marked with a wild, tempestuous tumult of praise and adoration, in marked contrast to the dignity of true Roman ceremonial, such as befitted Rome's temperament and such as was eternally expressed in the imperishable monument of the Pantheon.

No religious monument in Rome evokes greater wonder than this temple, first erected by Agrippa in 27 B.C., roofed with a dome that rivalled the sky, sheltering the statues of many divinities. In this structure, though far removed from the conventional type, Roman religious aspiration of the Augustan days—when divine favor again seemed inclined to the fortunes of the Romans—found typical expression in the serenity and calm, in the dignity and repose of this permanent structure. The pride of the contemporary Romans and their sense of serenity were visualized before their eyes in the concrete and the marble of the Pantheon which, paradoxically enough,

however, yielded its spirit to the gentler missions of another faith, for in time the bones of hundreds of martyrs from the catacombs reposed here and the temple was rededicated as the church of S. Maria et Martyres.

The late temple of Venus and Rome, built by Hadrian, represented the extreme of magnificent splendor in Rome's religious architecture but brought into association the old concept of the Roman's descent from Venus and the new idea of the deification of the Eternal City. The latter notion followed upon the heels of Emperor Apotheosis but was linked with older traditions in this double temple, which had two cellas, erected back to back, the one facing the East, the other, the West, the one containing a statue of Venus, the other an image of the deified city which at this time was approaching the height of her material splendor. The temple was entirely covered with marble, the roof glittered with gilt tiles, while the pediments were sculptured in relief. One of these told the old story of Mars' love for Rhea Silvia and also showed the she-wolf suckling the twins, born of that mythical union. It was to historical or quasi-historical themes that Roman sculpture dedicated itself, falling far below the idealization of Greek sculpture such as adorned the Parthenon and the Erechtheum. Though subtle poetry be lacking in the Roman edifice, at least Rome's proud spirit of dominion is reproduced in this temple-structure, and we have a naïve confession of the ambition of Rome revealed, alike in the gods whom she worshipped and in the temples which she erected.

The spirit of the older days of greater simplicity and humility continued in the numerous altars that survived throughout the city, of which the so-called "altar to the unknown God" may serve as an example. Earlier altars of turf yielded to altars of stone, often richly adorned with sculptured reliefs. The god whom Calvinus invoked is unknown to us and the dedicant himself was in a quandary what deity to honor—thus following a custom, well-known to students of Roman prayer, of addressing himself in non-committal fashion to either god or goddess who might find satisfaction in the humble gift.

Very early in her history Rome organized her priesthoods and in due course the elaboration of ritual was completed whereby the proper ceremonial was provided for every conceivable occasion in public and private life. It was inevitable that a people gifted with a genius for organization which manifested itself in political, legal and military relations should develop the most elaborate formalism of worship. "The daily ceremonies conducted at the most important temples by flamens, the ritual of dedication of new temples, the conduct of festivals, the domestic cults observed by the father of the house and his family, these and all other religious practices required the utmost scrupulous care" on the part of the participants who obtained due training in their parts of the dramatic performance. Rome never lost sight of ritual which seemed to her the very essence of religion, and in order to preserve the right relations with her gods she depended upon the proper performance of religious obligations on the part of her priests duly instructed in the religious lore. It was the pontiffs who were in general supervision over the religious organization and its work as a whole, and the position of pontifex maximus to which even an emperor might aspire was a position of greatest responsibility and honor. Nor has the position of pontifex ceased even to this day; although the Regia has long since fallen to ruins, St. Peter's is its historical successor, the home of another great high priest. The pontiffs guarded the sacred lore, decided in cases of new dedications, were the repositories with whom rested all knowledge regarding ceremonies, determined the proper procedure in cases of omens and prodigies, and were the final court to whom all cases of dispute were referred. The statement of the great lawyer and pontifex maximus, Scaevola, shows us the difficulties that beset the priest in times of scepticism and waning religious beliefs. Denying the validity of mythologies, as the idle product of poets' fancies, this champion of the traditional and the orthodox, stoutly defended the maintenance of the state-religion for the masses and required that statesmen and citizens subscribe to dogmas that these same individuals had from

philosophers learned to be false. As Augustus became pontifex, there was a re-vitalization of the old principle of the unity of church and state; the identity of priest and king was again emphasized, to proceed on its long course of European politics and history.

The augural college is regarded as distinctly Italic in character, and the function of the augur was associated by the Romans even with the reign of the mythical Romulus who gained the credit for the original foundation of the ancient city Numa was inaugurated by an augur, who, with lituus in hand, solemnly prayed to Father Jupiter for a sign and waited until that sign was given. Divination by birds was a science of no mean consequence in determining the will of the gods, for the diviner must needs be an ornithologist in order to interpret the significance of the flight of an eagle or a vulture, or the screech of an owl, raven or crow, or the call of the woodpecker. The height, the flight and the manner of flight also came under the priest's observation, while at the time of the taking of the auspices nature was required to be attentive to his will. There could be no rustling of leaves, no creaking of chairs, no gnawing of mice, the sky had to be clear and the winds be still. The augurs also gained knowledge of the divine will and purpose by observation of the manner in which the sacred chickens ate of their food. Obviously there was abundant room for deception, and augurs are reported to have made false announcement of their observations. One admiral, impatient at the chickens' reluctance to eat of the corn thrown before them, threw them into the sea that they might at least quench their thirst.

As for the haruspices, they came to Rome from Etruria with a wealth of fictitious as well as true information about lightnings, about the manner of averting the evil consequences of prodigies and of determining the purpose of the gods from appearance of the liver. It was Cato who said that he marvelled how one haruspex upon meeting another could refrain from scornful, ironical laughter. At a later time, a wicked legacy hunter, Regulus by name, played upon the fears and

superstitions of an excellent woman, named Verania; he called in the services of an haruspex to confirm his own prognostication and to influence the poor victim to make out a will in his own favor.

Flamens went about the streets, proud in their robes, as special priests, although the flamen of Jupiter was not greatly envied in the 2d and 1st. centuries B. C. "In the year 209 B. C., a young C. Valerius Flaccus, the black sheep of a great family, was inaugurated against his will as Flamen Dialis by the pontifex maximus. It was within the power of the head of the Roman religion to use such compulsion,"—unusual as the procedure may have been. "In this case, as Livy expressly tells us, it was used because the lad was of bad character;—and it is pretty plain that the step was suggested by his elder brother and other relations, in order to keep him out of mischief. For the taboos on this ancient priesthood were numerous and strict, and among the restrictions laid on its holder was one which forbade him to leave his house a single night." The flamens were in daily attendance upon their duties and the name may refer to the building of fires upon the altars. This priest was distinguished by a particular type of cap which he wore; it was made of felt and from it there projected a small twig wound round with wool. His wife's headdress was even more picturesque, resembling in appearance the goal of the chariots in the circus; bound to her hair by a fillet, it towered on high, to the discomfiture no doubt of the wearer, but a distinguishing mark of her eminence.

Elected to the priesthood between the years of six and ten, the young Vestal served a novitiate for a decennial period, after which she was competent to serve the goddess of the state-hearth. For ten years, as a young woman in her prime, approximately from eighteen to twenty-eight, she was in full service, while a period of another ten years was devoted to instruction of the newer arrivals. The Vestals could, after a devotion of thirty years to the purest and noblest religious function in the pagan city, withdraw from the sisterhood, and, leaving the nunnery, return to civil life; but as a rule they

ended their days in the sequestered calm of the House of the Vestals. Guardianship of the sacred flame, upon the maintenance of which the sempiternal power and majesty of Rome was thought to depend, was the central function in the life of these maidens, originally chosen with great care. Regard was had to their physical fitness and to the purity of the home from which they came. Offering daily prayers for the people,—in case of prodigies it was their duty to offer special invocations. Their life was markedly simple and the character of their lives was symbolized by the white robes they wore. A fillet was bound about the forehead and at sacrifices they wore a white veil besides. They enjoyed exceptional privileges, as seats of honor at theatrical performances and at gladiatorial combats; a lictor attended them on the streets and even the consul yielded to them in passing on the high-way; a criminal might find refuge in the intercession of one of these pure damsels. The Vestals participated in many of the public festivals, while the special festival of Vesta fell in the month of June when there was a great cleaning of the temple and of city-homes,—an ancient celebration of "clean-up" week. On the 1st. day of March, the sacred fire was renewed and the laurel wreaths that bedecked the Regia were replaced with fresh boughs. The extinction of the fire was an evil omen which terrified Rome, more than once. According to tradition, the Vestals were forced in 390 B. C. to flee from the Gauls. The life of the Vestals had all of the distinction of a charmed existence, but woe to the Vestal who proved faithless to her vows of virginity. For the Campus Sceleratus, near the Colline gate, more than once witnessed the burial, alive, of such an offender, whose criminality whether voluntary or under constraint threatened the very existence of the State she represented, in her capacity as priestess of Vesta.

In any ritualistic ceremony extreme caution was observed about every detail. The priest's head was veiled, a circumstance that seemed curious to the Greek commentators on Roman religion. Upon the altar, that regularly stood before the temple, in earlier days the simplest of offerings were made to

the gods who were thought to rejoice in first fruits, milk, beans and spelt. Wreaths were trimmed about, but in time wine and incense were added, and animal sacrifices made. The victim was adorned with fillets and was sprinkled with grains of spelt, coarsely ground and mixed with salt. It was essential that the victim proceed willingly to the sacrifice, and the sex, age and color of the victim were of importance according to the god to whom the sacrifice was to be made. Prescription with reference to the implements to be employed was also precise, as in the case of oxen, an axe was used, but for a calf, a hammer. The pig was slain with a stone, the sheep with a knife. The attendants at rituals were numerous, as details were assigned to a multitude of different officials. There were the criers who shouted "favete linguis," exhorting silence. On occaions there were flute players and players of stringed instruments. There were boys and girls who served as acolytes, assisting at the sacrifice, pouring out wine at the sacrificial meal, and singing hymns when these were required. Meantime humble attendants had prepared the temple. The sacrifice performed, haruspices examined such organs as the liver, the gall, the lungs, the heart to discover their acceptability to the god, while the flesh was part of the sacred banquet. The Salii and the Pontiffs gained repute as fastidious Epicureans, whose banquets became a by-word for prodigality.

Holding the altar with both hands, the suppliant invoked his god. Here, too, the same formalism prevailed and many types of prayers for different needs were ordained by state-authority. These became stereotyped and we are told that in the case of the Salii they repeated from generation to generation prayers that the priests themselves were utterly unable to understand. Many prayers were, no doubt, contractual in character and as binding upon the suppliant as any legal compact. Yet other prayers represented a greater degree of humility. In still others, there appears what has been called the dynamic theory of prayer and sacrifice, which points to a belief "that a mystic current of religious force passed through the victim, from priest to deity and perhaps back again," glorifying God

and re-acting upon the worshipper. Prayers were, no doubt, in the great majority of instances, for material blessings, and prayers for literary inspiration, for an old age full of music, or for a sound mind in a sound body are as rare as they are felicitous. The suppliant at the altar might face toward the East or face the statue, with hands uplifted if praying to Jove, or directed to the Earth if imploring Tellus or the gods of the lower world. In various cults, practice differed so that turning from left to right or from right to left, or walking about the altars is variously recorded. Supplications or prostrations before the statue of the divinity were also practised. In case of any slip or error, the *piaculum*, *i.e.*, the propitiatory or expiatory rite, provided opportunity for re-establishing the desired equilibrium between man and god; it consisted of a repetition of the first rite or an additional sacrifice.

With the influx of oriental cults, Rome became familiar with the rites of Cybele, of Isis and of Mithras, and the air was filled with a variety of invocations inharmonious and irreconcilable. Not the least fantastic of all were the native Salii, priests of great antiquity who carried over from the ancient days into the Empire period customs and beliefs, equally primitive. In March and October, this body of priests, twelve in number, carried through the city in procession those shields called the *ancilia*, one of which was said to have fallen from heaven, while the other eleven were made by the hand of man to safe-guard the gift that had come from Jove. Clad in embroidered tunics, with helmets on their heads, and bearing the sacred shields on their left arms, these soldier-priests of Mars proceeded with their solemn, barbaric dance. Accompanied by trumpeters, they beat upon their shields with a short spear or staff, preserving (as it is believed, to-day) the war-dance of the ancient-Italic warrior who was concerned with the magic expulsion of evils. As for the conduct of members of the priestly organization, we read an amusing (though not typical) episode in Livy. In the year 311 B. C. there was a strike of the musicians (*tibicines*) who had been denied their ancient privilege of dining in the shrine of Jove and therefore withdrew—in a body—to

Tibur that there might be no qualified flute-players to perform at the sacrifices. The senate duly sent ambassadors to the neighboring city to see to the return of these important religious officials. When other persuasion failed, the shrewd Tiburtines wined and dined the recalcitrant strikers until they were in a state of intoxication. Then piling the inebriated musicians upon wagons they carried them back to Rome where the dawn of the next day discovered them in the Forum to their own surprise and chagrin. But the strike did not fail, for not only was the original request granted but even further indulgence was allowed the bold players who dared interrupt the concerns of war with their own nonsense.

With all this phenomenology of ritual ever present to his mind or before his eyes, the Roman had little opportunity to forget his gods, whatever at one time or another his attitude toward the whole amazing institution may have been. But besides gods, temples, priest-hoods, sacrifices,—in festivals, too, the Roman had ample opportunity to develop his instinct for pomp and ceremony. The solemn processional was as characteristic of religious life as it was of the secular with its sonorous march of the triumphant general. The city adopted for purposes of purifying the whole people, an ancient ceremony of the fields, called the *Ambarvalia*. In the urban festival, the ceremony took place in the Campus Martius at the close of the census, when the procession proceeded about the assembled host. But the rustic festival was conducted in the month of May when the crops were ripening. Three times the procession of victims, the bull, sheep and pig, passed all around the fields, attended by a garlanded crowd bearing olive branches and chanting hymns. After a prayer for the household and the slaves, for the aversion of all disease, for the increase of fruits and crops, the sacrifice (the *Suovetaurilia*) took place and the sacrificants thus made their peace with father Mars and with Ceres. Beautiful and impressive processions marked many a *lustratio* (purification) and constituted an important part of many a state and gentile festival. Proceeding with dignity and reverence, stately and solemn,

these processions were watched with pride by the patriotic Roman all through the period of the Empire, until the Catholic church adopted many of these ceremonies to its own ritual and gave them a new meaning: "As the shadows move majestically over the mountains, so the procession of the priests, suppliants and victims passed through the streets of many an Italian city." Oft-times the Forum was filled, or the crowd streamed to the Palatine to watch the bon-fire festival of the Parilia, or flocked to the graves at the time of the Parentalia to offer tributes of fruits and violets to the dead, or gazed in wonder at the elaborate ceremony of the Megalesia when Magna Mater was born in state wearing a mural crown, her chariot drawn by lions. The *lectisternia* furnished further distraction, when the *epulones* prepared the banquets for the gods, at which the images of the gods lay on couches in public view. The Lupercalia, besides, survived vicissitudes of kingship, republic and empire, when priests scantily clad beat the bounds about the Palatine. In 17 B. C., Augustus with unparalleled splendor celebrated the secular games. For three days and for three nights the festival continued, with numerous sacrifices of ewe-lambs and she-goats, and with the offering of a sow, big with young; white bulls and white cows were also sacrificed and consecrated cakes were offered to the gods; scenic representations added to the splendor of the occasion, and when the festival reached its climax, a chorus of twenty-seven boys and twenty-seven girls sang the liturgical hymn which the poet-laureate had written for the great anniversary: "Oh Phœbus bright glory of the heavens and Diana, mistress of the woods, who always have been and always must be worshipped, grant our prayer at this sacred season when the Sibylline verses advise chosen girls and lads of chastity to sing a hymn to the gods to whom the seven hills are pleasing . . . Oh! ye gods, grant character to our youth and make it teachable, grant peace to our old age and make it placid. To the race of Romulus grant prosperity and children and all manner of glory." This was the modest prayer of the poet Horace

who breathed the pride and the patriotism of the Augustan age.

Whether human sacrifices marred the history of Roman religion is a problem all too intricate to unfold at this time, but in the story of the Iphigenia sacrifice, Lucretius uttered a polemic, indignant and eloquent, as fierce as the Philippics of Demosthenes or of Cicero, whether it be against a real or an imaginary curse. Agamemnon had consented to the sacrifice of his daughter when the Greek fleet was assembled at Aulis in Boetia for the expedition against Troy. Storms detained the host. Calchas' demand that the fairest and best be sacrificed caused consternation. Although, as the Greek legend has it, the maid was rescued by the divine intervention of Artemis, Lucretius, to add force to his argument, assumes the reality of the hideous sacrifice.

From this survey of the organized Roman religion and ritual we carry away an impression of great orderliness and systematization of the methodology of worship. Piety was defined entirely in terms of proper performance of the established customs and neither in domestic cults nor in public ceremonies could ignorance or error be condoned. Virtue was not of necessity a product of such a religious attitude nor the fruitage of such religious observances. The same spirit and the same necessity of attending, with scrupulous care, to all the details of worship is also manifest in the religious practices of the home. There, the Lares and the Penates, Janus and Vesta, and the Genius were the chief divinities inspiring veneration and requiring suitable offerings. The father of the family, his wife, his steward, his sons and daughters constituted a priesthood upon the pattern of which, indeed, the state organization rested, where the "King's Daughters" were, anciently, such not only in name but also in fact, in the service of the state religion Morning prayers were the established custom in every orthodox home, observed even by the irreligious members of the imperial household. "In the old and simple house, the table would be placed at the side of the hearth and, as the household sat round it, master and man

together, a part of the meal, set aside on a special sacred dish, would be thrown into the flames as the gods' portion. Sometimes incense might be added and later a libation of wine. When images had become common, the little statuettes of Lares and Penates would be fetched from the shrine (*lararium*) and placed upon the table in token of their presence at the meal. Even in the luxurious, many-roomed house of the imperial epoch, when the dining-table was far from the kitchen-hearth, a pause was made in the meal and an offering sent out to the household gods, nor would the banquet proceed until the slave had returned and announced that the gods were favorable." Special offerings were made to the Lar on the Kalends, Nones and Ides, and to the Genius on the birthday-anniversary of the pater-familias. A special ritual to the dead was conducted by the family in February and in May. When the young boy of the household had attained his majority and was ready to assume the *toga virilis*, the Lares were crowned; cakes, honey, wine and incense were offered while the family and relations proceeded in solemn state to the great temple of Jupiter on the Capitoline to celebrate the *Liberalia*. The serpent was the symbol of the Genius, and in the days of the Caesars the worship of the emperor's Genius was added to the domestic ritual. Sentiment could and did cling to the Lares and Penates as the most intimately beloved of the Roman Pantheon, and Virgil idealized for the Romans the dignity of domestic cults in his glorification of Æneas as the bearer of those little gods who more than any others made for the unity and the discipline of the household. Birth and marriage were not without their religious ceremonies, and, whatever contact the individual had with state-ceremonies, it was in the home that a religious sense was developed and maintained; it was in the home that the flame of religious aspiration was kept burning during many years of decline of the state-worship.

Now let us consider what manner of gods these Romans worshipped, to whom they prayed with such extreme elaboration of ceremony Were the gods great and good? Did they inspire character? Did they offer hopes of reward for virtue

in another world, after the death of our mortal bodies? Did an Easter-tide suggest resurrection?

Rome's gods, whose number was legion, had their origin as we know, in the fearful expectancy of an untutored people which beheld divine presences and recognized divine influences in the otherwise mystic and incomprehensible manifestations of Nature. The rustling leaf, the whispering fountain, the thundering heavens, the terror of volcanic disturbances, the bounteous earth, the shock of the storm, the fear of floods gave birth to the idea of gods whom imagination in time raised into Powers, omnipotent, omnipresent and omniscient. The succession of centuries increased the number of original gods, and genuine Italic divinities fraternized with or were assimilated with cognate Greek deities so that the Pantheon of the Augustan city became the concrete symbol of that army of greater and lesser gods and goddesses who in theory and in fact were thought to watch over the destinies of the imperial city and the interests of all her subjects. Through Greek influences, the gods gained in personality, and for the orthodox-minded, Jupiter was a god of majesty and of power, who thundered in the heavens or who, with glowing right hand, might smite the citadels and terrify the world; a god of equity, too, who with justice ruled the affairs of men and gods, who governed over land and sea, who inspired the veneration and adoration due to the Father of all of us. In the fine fabric of eloquent prose and burning poetry the god of gods received his true immortality, and this literary reflection gains in value for us as it represents the conviction of the peasant and the soldier, the belief of the Forum and the market-place, as it became the universally accepted inspiration of the orthodox. A great multitude subscribed to the sustaining belief that this Jehovah of the Roman people had seen their remote ancestors through the burning of Troy and conveyed them in safety to their appointed mission in Italy. To believe themselves descendants of Anchises and Venus was to possess an exaltation of spirit and a divine sanction of conduct, which had received its first approval in Jupiter's defence of Æneas and received a

confirmation in Juno's acceptance of the founder Romulus, son of the war-god, into the glorious ranks of the gods. With this stirring belief in ancestry—an impelling human motive which has led many another people to nobility of human works or to a degradation of the human spirit—the Roman could, with no loss of religiosity, accept the tales of gods which had been repeated for generations by gossip-loving Greeks, by annalists and bards. A cloud of mythology could not obscure the essential characteristics of deities while the gain in human qualities was balm to the Italian longing for personal relationship with the unknown.

Juno Lucina was gracious, despite the scandals to which imagination lent a ready ear; Juno Regina was the incarnation of commanding womanhood, despite the anger to which she was prone. Apollo's boasts that Jupiter was his sire, that he had harmonized songs to the strings of the lyre, that his arrow was unerring, that the healing art was his discovery, that he was the Saviour of men, that the Delphic land, Claros and Tenedos rendered him homage represented the greater glory of the god, associated with the sun and gifted with prophecy. Yet the charm of Daphne revealed the human weakness inherent even in divinity and rendered more lovable thereby. The flight of Daphne, the inspiration of poets of old and of more modern sculpture, had been a sad trial to the great god who pursued her in vain as she fled before him, the breezes causing her careless locks to spread behind her and her garments to flutter. Praying to her father and mother earth to aid her, a heavy torpor seized upon her limbs and her soft breasts were covered with the bark of the tree, her hair grew into green leaves and her arms into branches. A leafy canopy covered her features and the god sought vain consolation in his embrace of a laurel tree. Apollo and Diana, the wondrous pair, the one the mistress of the groves, the other the bright glory of the heavens, children of a Delian romance that endeared them to human hearts, were ennobled in verse and exalted in marble which lent its lustre to the cult of these divinities. Diana was the virgin goddess, the mistress of the mountains, of the woods

that are green, of sequestered glades and of rushing streams. Legends of the goddess haunted Akragas, Erymanthus and Algidus, while maidens who were pure and lads of chastity sang the praises of the twin deities on festal days.

Merchants honored Mercury, but the narrower concept of a god of trade and of cunning commercial practise was broadened by Greek idealization. Worship was offered this divinity by all who sought fame in eloquence and by those who prayed for the safe-conduct of their souls to the shadowy realm where the grandson of Atlas, the St, Peter of pagan days, with his golden wand gathered together the unsubstantial crowd in the homes of bliss. The longing for immortality, the yearning for a re-union with the blessed dead found poignant expression in the tragic story of Orpheus' love for Eurydice, the epitome of a thousand sufferings, as Orpheus sought to win victory over the grave and remove the sting of remorseless death. Before the tribunal of Pluto and Proserpina, the master singer conquered the heart of the queen of the lower world, stayed the punishments of Ixion, Sisyphus and Tantalus, but not even the incomparable skill of the peerless singer could achieve the impossible, so that Melpomene triumphed over even his longing and he, too, tasted the cup of tragic bitterness. Not so, the benign and blessed Ceres, who through the miraculous aid of Arethusa discovered her lost Proserpina and regained her from the lower world for at least the time of Nature's resurrection and recovery from winter's blight. While the festival of the Cerealia reminded Romans of their instinctive hope of and belief in immortality, their religious organizations and beliefs as a whole gave little sanction to such hopes. These were developed quite apart from their theology and their worship, passing through primitive forms into the most logical system that a confident imagination and a dogmatic philosophy could devise.

The goddess Venus by her own amours heightened the significance of human affection for lowly as well as for mighty. Love and beauty found in her their chief exaltation, and imagination granted this goddess authority throughout the

universe of sky, earth, sea and even the underworld where Pluto became subject to the subtlety of her invincible charms. Spring and the flowers were within her domain; youth was her willing subject and paid at her shrine the tribute of affection; soldiers worshipped her as Venus Victrix. The reputed birth of the goddess from the foam of the sea gave abundant opportunity for fancy to speculate on the frailty and the delicacy but none the less the depth and permanency of surging human emotion. As mother of the brood of Æneas, the Romans owed her special devotion; and the goddess, anciently in Italy a humble divinity of the garden, was raised to the supreme rank of motherhood, as is amply attested by poetry, sculpture and religious architecture.

Roman religion had provided gods, innumerable, for all the emergencies of life, the crises and the conquests. The earth and the seas, the underworld and vault above the earth had their gods. The sailor prayed to Castor and Pollux, the shining stars; the husbandman importuned Saturnus; Faunus delighted the rustic folk with his woodland melody, and in every home the Lares exercised due care over the welfare of the family in its domestic ritual. The polytheism of Rome was the outgrowth of an unorganized universe that held a wealth of marvels for the astounded Italian who wondered and worshipped, and peopled his world with Powers greater than himself. The Roman, having once conceived his gods, devoted himself far more to ritual than to theology, and might have remained content with his vague, impersonal deifications of the forces of Nature had he not learned from Greeks the greater comfort of gods made in the image of man, gods with all the genius and the frailty of man magnified to the degree that befitted a god. The inherent absurdities were manifest to the early Christian theologians who did not hesitate to ridicule the multiplicity of Rome's theology which, through the inane activity of officious priests, had grown to an intolerable extent until gods were card-catalogued to guard over eating, drinking, nursing, sleeping, crying, walking, riding, ploughing, sowing, reaping,—over every trivial act from

birth to death. Yet, in spite of all these absurdities, the Graeco-Roman polytheism of the 1st and 2d centuries A. D. satisfied the religious craving of an orthodox multitude which had not outgrown superstitions, which cherished inherited beliefs of ancestors, and which swore by and died by the gods of their fathers. The polytheism repeated cherished ideals of powers, incarnated hopes of dominion, confessed to human weaknesses—in short, deified the nature of the race for better or for worse. That there were rebellions of scientists and of philosophers against the old, established systems falls without the purview of this sketch of orthodox notions of gods and of their worship.

Out of an inherent instinct for order, Roman religion developed a magnificent system of hierarchical splendor of which we have had a glimpse. Gods grew along with the political, the economic the social, and intellectual development of the people, and it was no wonder that deification of emperors and of *Roma aeterna* constituted the final and the highest point in a history of religious aspiration which from beginning to end associated the State and Divinity so closely. The eminently practical Roman indulged in few extravagant fancies—and, early in her history, the army became the right arm and the church, the left arm of Rome in a material conception of the world. The Eternal City was under the protection of a Destiny (*Fatum*) whose decrees the gods carried out for her welfare. Temples increased in splendor in the imperial days in order to match the swift evolution of secular architecture, which in the circus, in the amphitheatre, in the basilica, in theatres, baths, tombs and palaces realized the irridescent dream of material splendor that had fired the imagination of Julius Caesar and of Augustus. Priesthoods were re-habilitated and ceremonies amplified, which perhaps lulled to rest in the orthodox mind disturbing questions about god and carried along an unquestioning devotion. For the appeal to the senses and the emotions was powerful, through the medium of rhythmic motion, of soothing incense, of modulations in color. The effect of the whole was

a voluptuous soaring into the realm of the gods, an uplifting encouragement that the beneficence of the gods could not fail to fall upon the worshipper's devoted head. That there was skepticism in the face of all organized worship, that there was unbelief which was not convinced by the machinery of worship is known to us all. But the consul who on the battle-field in despair exclaimed that not vows, not prayers to the gods but only their own might and valor could save his soldiers in the extreme crisis,—was laboring under intense excitement. The intellectuals paid little heed to the mockery of auspices, but the orthodox world continued to believe that sacrifices were agreeable to the gods. One, with simplicity of devotion, might fain believe that a pure hand touching the altars and that offerings of spelt and crackling salt would prove more acceptable than a sacrifice of animals and offerings from Arabia. Even in spite of philosophic emancipation, one might still continue an affectionate devotion to and worship of Pan, joining the country-side in sacrifice of a tender kid and in offerings of wine. For the toga-ed race manfully stood by its traditions and its conventions. What need to fear, with Jupiter in his heaven and his vice-regent, Caesar, on the throne?

Knowledge of the proper manner of worship of the gods was the central question with the simple Italian in the long ago when the groves were the only temples, and when on Nemi's side Diana received her first invocations. No less, in the latter days, when the Palatine shimmered as the central jewel within a crescent of glittering hills, Romans interpreted a humble walk with the gods in terms of *ritual*, and felt security was vouchsafed as long as the silent Vestal with the Pontifex trod her patient way to the Capitoline in due fulfillment of ceremonial worship.

DALMATIA AND ADJACENT LANDS OF THE JUGO-SLAVS[1]

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Possibly the most interesting of the new States that have emerged as a result of the disruption of the dual empire of Austria-Hungary is Jugo-Slavia, the Land of the Southern Slavs, or to give it its official name, the Kingdom of the Serbs, Croats and Slovenes. The new nation includes in addition to the former independent states of Serbia and Montenegro, the following provinces of the old Austria-Hungarian Empire, Carniola, Croatia, Slavonia, Dalmatia, Bosnia and Herzegovina, as also the former Turkish Province of Novibaza.

Our purpose is to treat the subject under three heads as follows: First, a presentation of the historical and cultural background of the peoples embraced within the new state; secondly, a review of the territorial and other claims of the Jugo-Slavs and Italians and the efforts of the Peace Conference to solve the Adriatic problem; and finally, an examination of some of the factors, both external and internal, that must affect the future of Jugo-Slavia.

The realization of the century long Slavic dream of nationality, is pronounced by Professor R. J. Kerner, in his brilliant and scholarly essay on *The Jugo-Slav Movement*, as "a miracle," "if there are miracles in history." Tragic and absorbing is the history of the Slav peoples since they entered the region of the Balkans in the seventh century, and the forces which contributed to their division in the thirteen hundred years that have since elapsed. Of even greater present interest is the

[1]It should be noted that some of the conditions which were true at the time the lecture was given, April 17, 1920, have since changed.

story of their recent reunion; how the various chasms between them have been bridged, and the numerous economic, social, religious, geographical and political obstacles to national unity have been surmounted, until a Jugo-Slav State is now a reality.

Only a brief review of the outstanding events in the history of Dalmatia will be essayed, as our theme relates primarily to present day problems and condition. "Perhaps," says Major Powell in a recent magazine article, "no stretch of coast in all the world has had so varied and romantic a history or so many masters as the Dalmatian seaboard," and he proceeds to enumerate some twenty-seven different peoples or nations that at some period within recorded history have ruled over it.[1] But for the greater part of its history during the past twenty-five hundred years Dalmatia has been successively a province of four great empires, first of Rome, then of the Eastern Empire, later of Venice and for the past century of the Austrian Empire. When the Romans first came in contact with Dalmatia it formed a part of the independent Kingdom of Illyria, originally occupied by half-barbarous tribes, who were probably the ancestors of the modern Albanians, with Greek colonies scattered here and there along the coast and adjacent islands. At various times in the two and one-half centuries B. C. Rome made efforts to extend its sway over the Illyrians with varying success, but in 9 A. D. they were finally conquered and Dalmatia subsequently became a most important part of the Roman Province of Illyricum, and a favorite recruiting territory for the Roman army. Several of its successful native commanders succeeded to the purple. Of these Diocletian was especially illustrious for his power and grandeur and is remembered for the noble palace he reared at the present site of Spalato, extensive remains of which are still in existence and serve as visible witness of the resources and splender "which once was Rome's." When Diocletian abdicated in 305 A. D. he retired to a villa near the Roman city of Salona, once the capital of the Province but now only a ruin, as it was destroyed by the Goths in the sixth century.

[1] Scribner's Magazine, January 1920.

After the division of the Empire near the end of the fifth century Dalmatia was contended for by the Eastern and Western Empires. It fell some times to one and some times to the other. Finally, it was wrested from the Western Empire by the Goths, who over ran it, until they were conquered in the reign of Justinian and it was attached once more to the Eastern Empire. But it was soon exposed to successive invasions of barbarous tribes that came from the Northeast. After resisting the Bulgars it fell under the attack of the Avars in the sixth century. The Eastern emperor Heraclius called to his aid the Croats, a Slav tribe then dwelling in the Carpathian mountains, to drive the Avars out. They conquered them in the years 630–634, and with other Slav tribes occupied the entire province, except some of the coast towns and islands, the Croats occupying what later was known as Hungary and Croatia. The Slovenes settled northwest of them, while the Serbs occupied the entire region to the south of both, as far as Albania and comprising the territory of modern Serbia, Bosnia, Herzegovina and Montenegro. Thus the Slavic race and tongue was introduced into this whole region. The physical features of the country combined with the political and economic conditions tended to separate them, so that in time they developed into three independent kingdoms. Early in the thirteenth century religious and cultural differences were added to still further separate them. The Croats and Slovenes naturally came into close touch with Western Europe and its cultural influences. The Serbs on the other hand being nearer to Constantinople were affected by Byzantine culture. The former adopted the Roman Catholic religion, the Latin alphabet and western culture. The latter accepted the Greek Orthodox religion, the Cyrillic Alphabet and the civilization of Constantinople. These differences still exist and must be reckoned with in the future development of the new State.

In the course of the next few centuries each of these Slav kingdoms was in turn overthrown. The Slovenes were annexed to the Austrian possessions of the Hapsburgs, the

Croats of the interior came under the control of the crown of Hungary and the Serbs, after a valiant resistance finally in the middle of the fifteenth century, fell under the dominion of the Turks.

In the meantime a continued contest for the possession of the cities of the coast and the narrow strip of land connecting them was being waged by Venice successively with the Byzantine Empire, the Kings of Hungary and various Slavic princes, with varying fortunes until by 1420 she finally secured definite control over all save Ragusa and its dependencies. From that time on Venice successfully resisted the advance of the Turks up the Adriatic. The Dalmatian cities, with the exceptions just mentioned, remained under the sway of the Lion of St. Mark until the conquest and dismemberment of Venice by Napoleon. Hence the imprint of Venetian culture, which is so apparent in the coast towns to-day. Dalmatia was apportioned to Austria by the Treaty of Campo Formio in 1797 and was confirmed to her by the Treaty of Vienna in 1815, when the Emperor of Austria added to his titles that of King of Dalmatia. Since that time it has remained among the Hapsburg possessions until the close of the recent war. While Dalmatia was attached to Austria, Croatia in 1867 was incorporated into the Kingdom of Hungary. After the Russo-Turkish War Bosnia and Herzegovina, Turkish Provinces, were entrusted by the Congress of Berlin in 1878 to the adminstration of Austria-Hungary. After holding them in trust for twenty years in 1908, the European situation being favorable, the Dual Monarchy formally annexed them, without seeking the sanction of the European powers. This nearly precipitated a war, but Russia had not recovered sufficiently from her war with Japan to effectively champion the cause of Serbia, which had looked forward to adding these lands to a greater Serbia.

This region of the Balkans previously so unfamiliar to the average American has been thrust upon our attention during the past year or more by the almost daily reports of the dramatic developments relating to the territorial issues connected

with its various lands and peoples. No question gave the Peace Conference more trouble from first to last, or, was more productive of intense feeling and friction, both within and without the Paris Conference, than those relating to the boundaries of the new Jugo-Slav State and a satisfactory solution of the Adriatic problem. The efforts to reconcile the territorial claims and aspirations of the Southern Slavs and the Italians have so far been unsuccessful.[1]

By the Treaty of London, April 25, 1915, which remained secret until published by Trotsky, the Allies, to secure the entrance of Italy into the war on their side, conceded to her not only Goritzia, the peninsula of Istria—including Trieste, the chief commercial port of Austria, but also the northern half of Dalmatia and the numerous islands that hem in the main land nearly as far South as the City of Spalato. Southern Dalmatia with the islands not given to Italy was to be neutralized, and Valona in Albania was also to be granted to Italy to enable her to dominate the Adriatic. Thes econcessions run directly counter to the aspirations of the Jugo-Slavs, who assert that the inclusion of any of the territory of the former province of Dalmatia is contrary to the racial, cultural and economic needs of the overwhelming majority of the population. For they claim that there are over 290,000 Jugo-Slavs in Northern Dalmatia as against some 16,000 Italians, or less than three per cent.

By the Treaty of London, Fiume was not included in the territory guaranteed to Italy, as in 1915 it was not anticipated that Austria Hungary would be so completely crushed. But with the signing of the Armistice, Italy advanced its claims and insisted upon the possession of Fiume also. The Jugo-Slavs have strenuously opposed this new demand to their chief and only first-class commercial port.

Italy bases its claims to Fiume as well as to the northern part of Dalmatia on racial, cultural, economic and strategic grounds. The majority of the inhabitants of the city of Fiume, apart from the smaller and older Slav city of Sussek, is undoubtedly Italian, although the figures given are con-

[1] See *post*, p. 414, note 1.

flicting. Major Powell states that three-fourths of the city's 40,000 population is Italian, while Professor Seymour of Yale cites the Hungarian official statistics for Fiume and suburbs as showing the races nearly equally divided. It is safe to conclude that the life, architecture, prevailing language, and other cultural aspects of the city are Italian, although it is surrounded on all sides by a Slav population. Italy's historic claim to Fiume is weak. While the city has been subject to Italian influence and culture, it had not been under Italian rule prior to d'Annunzio's seizure of it, save for a few days under the Republic of Venice.

The economic basis for Italy's demand for Fiume is to insure her commercial supremacy in the Adriatic. Should the city pass into Jugo-Slav or neutral control, Italy believes that the trade of Trieste with the interior would be diverted to Fiume, and the former city's commercial ruin would follow.

But the strongest of the reasons urged in support of Italy's claims to Fiume as well as to parts of Dalmatia and the adjacent islands is based on the necessity of military protection. The fundamental question at issue between the Italians and the Jugo-Slavs is due to the strategic importance of the Adriatic and the contrasting nature of its two shores. The Italian coast is low and singularly devoid of good natural ports, while the Eastern shore, on the other hand, possesses a number of excellent harbors, and in addition the greater portion of this coast is flanked and protected by a series of islands, thus providing ample opportunity for the shelter of a hostile navy. The naval menace of the Eastern shore of the Adriatic, within four or five hours steaming distance of the Italian coast is an alarming one and it is natural that Italy should seek protection, not so much against the new Jugo-Slav State, but against the possible menace of a united and aggressive Panslavic power of the future which may threaten her security. She therefore demands strategic points on the coast like Fiume, Zara, Valona, and several of the important islands.

The Slavs meet each of these claims by counter arguments.

They maintain that on ethnic and geographical grounds Fiume belonged to Croatia and Croatia is now a part of the Jugo-Slav State and that the population of the surrounding territory is purely Slav. The Slavs' claim to Fiume on commercial ground, however, seems the weightiest of all, inasmuch as it is not only the natural but also almost the only feasible port of the new state. As an answer to the suggestion that she should utilize some one or more of the good harbors along the coast, the statement of a United States naval officer, reported by Major Powell, may be quoted. "It is not," he states, "a question of finding a good harbor. . . . It is a question rather of finding a practicable route for a standard gage railway over or through the mile high range of the Dinaric Alps. Until such a railway is built the peoples of the interior have no means of getting their products down to the coast save through Fiume. Italy already has the great port of Trieste. Were she also to be awarded Fiume, she would have a strangle-hold on the trade of Jugoslavia which would probably mean that country's commercial ruin."

To one who has travelled over the narrow gage mountain line from Gravosa to Sarajevo, the above opinion seems conclusive.

In reply to Italy's demand for strategic frontiers and ports and for the occupation of the Dalmatian archipelago it is pointed out that such a solution of the problem would be unwise and unjust as an additional cession to Italy of territory largely inhabited by a Slavic population. The islands, it is claimed, have a Slav population of over 116,000 to an Italian one of only about 1,500. Further, such an occupation would be a menace to the Dalmatian Slav ports, placing them and their approaches directly under the command of Italian guns. Finally they urge the consideration that militarism on the part of Italy toward Jugo-Slavia will beget militarism in return: that the proposed acquisition of a strategic boundary will in fact in the long run be a source of weakness rather than strength by creating a bitter antagonism and arousing a

sense of injustice on the part of the Slavic peoples so annexed, that it is likely to breed trouble.

From this analysis of the underlying factors in the situation, we turn to a review of the diplomatic developments and of the dramatic events which followed each other in rapid succession during the past year.

At the Peace Conference, President Wilson insisted that an adherence to the principles of "self-determination" and of "no bartering of peoples" would exclude Italy from the acquisition of either Fiume or Dalmatia, and he refused to recognize the secret Treaty of London. The public announcement of his views last spring created a sensation and led to the temporary withdrawal of Italy's representatives, Signor Orlando and Signor Sonnino, from Paris. Their subsequent loss of power and the formation of the new ministry of Signor Nitti led to no abatement in Italy's claims. There followed the sanguinary encounter between the French and Italian soldiers stationed in Fiume, and the *coup d'etat* of the Italian poet-aviator, Gabriele d'Annunzio, resulting in the seizure of the city by Italian troops and naval contingents that had placed themselves under his unauthorized leadership. The popularity of his act with Italians embarrassed the ministry and led it to pursue a temporizing policy toward d'Annunzio and his supporters, which cast suspicion on its sincerity. In the meantime, d'Annunzio continued to defy the government and seized Italian ships and war vessels with impunity, confiscated their cargoes and two million lire in money, directed a raid upon Zara, threatened other ports, and conscripted the inhabitants of Fiume for the defense of the city. The middle of last January he sent an airplane over Paris, which scattered over the city a cloud of papers which declared that "if the injustice against Italian Fiume and the Italian towns of Dalmatia is consumated, a combat is inevitable and blood must be shed."

While the Poet-Aviator was playing his spectacular role, the Powers continued to deliberate and to resort to the arts of diplomacy. The gravity of the situation, however, was

beginning to be realized, for M. Clemenceau declared that "only when this problem is solved can we begin to breathe freely." On December 9th, the United States representative, Mr. Polk's last act before his departure from Paris was to sign with Great Britain and France a note offering a compromise which promised a solution of the vexed territorial problem. The outstanding features of the same were: the creation of Fiume and its immediate territory and certain adjacent islands into a free State under the protection of the League of Nations. This was to serve as a buffer state between Jugo-Slavia and Italy. Zara also was to be made a free city under similar auspices, but the rest of Dalmatia was to be left to Jugo-Slavia, Italy to be protected by the cession of certain of the most important strategic islands of the Adriatic and the demilitarization of others as well as the possession of Valona.

Hardly had the United States representatives withdrawn before the Italian diplomatists succeeded in securing the British and French premier's signatures to a new note modifying the terms of the previous proposals and demanding the acceptance of the new conditions by the Jugo-Slavs or the provisions of the obnoxious Treaty of London would be enforced. The principal changes effected by the insistence of Italy relate to the status of Fiume and its immediate territory. Fiume was to remain as an independent city but without the adjacent territory. It was, however, to be given the right to select its own diplomatic representative, which unquestionably would be Italy. The chief change was a modification of the boundary which would advance Italy's frontier further to the East, ceding to Italy a strip of territory along the coast connecting Valona with Fiume. This has been characterized as Italy's "boardwalk" to Fiume. The Jugo-Slavs rejected these new terms, refusing to accept any modification of the line proposed by President Wilson. The latter also sent on February 10th a protest to the Powers against the new note and notified them that in case the concurrence of the United States was not obtained, that he might have to consider the withdrawal from the Senate not only of the Treaty of Versailles

but also the Anglo-American-French agreement. The effect of this unexpected pronunciamento of the President was a withdrawal of its ultimatum by the Council and an agreement that the two nations concerned should undertake direct negotiations. These are now in progress.[1] The problem while difficult does not seem incapable of a just and wise solution. "A fair compromise and a friendly agreement between Italy and her Slavic neighbor is a necessity for both of them as well as for the future peace of Europe. If the settlement be one-sided and prejudicial to the vital interests of the most concerned parties, it will stand for some time, causing permanent irritation and friction until it breaks out in new and sanguinary complications." These words written by Mr. V. R. Savić,[2] a Slav author, some two years ago seem equally true today. Mutual guarantees and concessions must be made, if an Italo-Southern-Slav war is to be avoided in the immediate future.

While the Adriatic question is at the present time the most acute of the problems which confront the Jugo-Slav State, there are others of vital importance, affecting both its external and internal relations, upon the solution of which its future existence largely depends. Let us first examine the position of the other Balkan Powers toward the new Kingdom. Roumania's attitude is openly hostile. Not only is this hostility due to racial antagonism of Latin and Serb which has existed for centuries, but it is reenforced by political jealousy due to the results of the war. Although Rumania has increased greatly in territory, population and resources by the awards of the Peace Conference, Serbia, her old rival, has also expanded to nearly an equal degree. Its rise to power is resented by the Rumanians, who see their ambition to play the role of arbiter of the Balkans challenged by the new Southern Slav Nation. Further Rumania is not satisfied with the division of the Banat between them, and is apparently only awaiting a favorable opportunity to wrest the western half from Serbia. The

[1] A Treaty has since been agreed to and ratified; the Treaty of Rapallo.

[2] Southeastern Europe, Chapter VII.

existence of a secret treaty between Italy and Rumania, agreeing to make common cause against the Slavs, is generally credited. Major Powell's quotation from the statement of a Rumanian cabinet minister made to him tends to confirm this belief. The minister predicted that "within the next two or three years in all probability there will be a war between Jugo-Slavia and Italy over the Dalmatian question. The day that Jugo-Slavia goes to war with Italy we will attack Jugo-Slavia and seize the Banat."[1]

Next to Rumania on the eastern frontier of Jugo-Slavia is another enemy, Bulgaria, the treacherous and relentless foe of Serbia in the recent war. It is common belief that an understanding also exists between Italy and Bulgaria that in case of an outbreak of hostilities between Italy and the South Slavs, Bulgaria will attack the latter from the east in an attempt to realize her territorial ambitions which were thwarted by the awards to Serbia and Greece. Albania and Montenegro have had a long standing feud, so that it is to Greece alone of the Balkan States that the Jugo-Slavs can look for sympathy and possible assistance in the event of war with Italy. From this survey it will be seen that her external relations are precarious and only the guarantee of a strong League of Nations is likely to preserve Jugo-Slavia from her natural foes.

In additon to these dangers from without there are serious internal problems that threaten the existence of the new nation. The outcome of the war gave the Southern Slavs the opportunity to realize their national aspirations, but their chief bond of union is that of a common race, and for the time being their common fear of Italy. Not only are there religious and cultural divergencies between the Serbs, the Croats and the Slovenes, that have been referred to earlier, but also differing social and political ideals and ambitions exist that do not make for unity. Socially there are decided

[1] Since the formation of the "Little Entente" in the summer of 1920, the relationship between Rumania and Jugo-Slavia apparently has changed for the better.

contrasts between them. The Croats and Slovenes possess both aristocratic and wealthy classes, whereas the Serbs are a nation of peasants, their aristocracy long since having been exterminated by the Turks. The contrasts in the educational attainments of the different peoples is equally marked. In Croatia and Slovenia the educational opportunities have been excellent and standards are high, whereas in Serbia the educational advantages have been few and the percentage of illiteracy is very large.

But what is more threatening are the manifestations of political unrest and discontent. In each of the former political divisions of the composite State there is a considerable party that is opposed to the centralizing policy of the Serbian leaders, which it is feared will simply result in the establishment of a greater Serbia under the permanent rule of a Serbian dynasty. The Slovenes are Republican by conviction but have accepted the monarchy and centralization provisionally as necessary for union. There is a strong party in Croatia that favors a federation. Last summer there was an unsucessful revolt against Serbian rule and only recently renewed rioting has been reported. A petititon signed by 160,000 Croatians was sent to President Wilson at Paris explaining a desire for independence, and it was reported that many more signatures would have been secured but for the prosecution of the Croatian League by the Serbians.

In Bosnia and Herzegovina the sympathies and antipathies of the population is chiefly determined by their religious affiliations. The census reveals the presence of some 600,000 Mohammedans, 460,000 Roman Catholics and 840,000 Orthodox Catholics of the Greek or Serbian Church, within their borders. The latter, representing a minority of the population. is the only element that welcomed the Serbian occupation. The Mohammedans and Catholics both favor federation rather than centralization.

The people of Montenegro also are divided in their political sympathies. A small element is still loyal to King Nicholas, who has never recognized the action of the Montenegrin

Assembly in deposing him in December, 1918. There have come occasional reports, as recently, of persecution of his adherents by the Serbian officials and troops. A stronger party of some of the ablest Montenegrines favor a real federal State, but for the moment the party that supports the Serbs is in control.

It is the opinion of Major Powell, who has recently visited the various countries of the Balkans, that "If a Confederation patterned after Switzerland or the United States, in which the various elements of the population would have equal representation could be effected,"—"with each state exercising the same sovereignty, so far as its internal affairs are concerned as the States of the American Union"—"Jugo-Slavia would develop into a stable and prosperous nation." Without some such concession to the demands for local autonomy and to the special interests of the old political and administrative divisions of the country, it would seem that the permanency of the present union is extremely doubtful.[1]

[1] The lecture was supplemented by over a hundred illustrations of the countries and peoples referred to in the address.

THE ARTISTIC ANATOMY OF TREES

By John W. Harshberger

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Light Values.—The person with the artistic sense has been impressed probably by the form of trees and the tracery of their branches, as outlined against the sky. Not only is the the tree silhouetted in this manner, but the color of the sky, the character and position of the clouds and the location and nature of the surrounding objects all form part of the picture. The appearance of the tree, or trees, under observation changes with the illumination. The tree in strong sunlight has an entirely different light value from a tree seen at sunrise, at sunset, on a day partially overcast, or on a cloudy day, while it is quite distinct on a day of rainfall. The color value of the tree is also quite different in the moonlight, or where it is lighted by a nearby electric arc. The visual impression, which the tree produces, also varies with the compass direction, whether it is against the northern, southern, eastern, or western sky, as a background. The Zuni Indians appreciated this light relationship, for they named their ceremonial maize, as follows: Thluptsi-kwa (yellow medicine corn) symbolic of westland and spring; Shi-lo-a-kwa (red medicine corn) symbolic of southland and summer; K' ó ha-kwa (white medicine corn) symbolic of eastland (dawnland) and autumn; Ku'-tsu-a kwa (speckled medicine corn) the corn of skyland and daylight. The aspect of any given tree is different in winter, especially if covered with clinging snow, or imbedded in crystal ice after a sleet storm, or when coated with the rime of hoar frost. The shadow, which the arboreal specimen casts, should not be neglected in this consideration of the effect made upon the visual sense organs, and this changes with the season of the year and the time of day. The tree shadow is longer in the

middle of the day at the winter solstice, than at the summer solstice. The long shadows cast with the declining sun have been often the subject of remark, when after the heated spell of the summer day the cool of the evening entices one to enjoy the great out-of doors.

Appeal of Study.—A study of artistic details of this description should appeal strongly to the color artist, the painter, the landscape architect and the lover of nature. The painter tries to convey his impressions of the scene of sylvan grandeur to his canvas by the employment of colors by which he emphasizes his interpretation of the color scheme and the light and shade values. The landscape architect attempts to assemble his trees and shrubs so as to interpret nature, and in accomplishing this, he must familiarize himself with the materials which he uses. He must know his trees and shrubs in their spring, summer, autumn and winter condition, their outline their colors, their flowering and leafing periods, their size and other details, which might influence the harmony of his landscape composition. The color of the foliage in spring, summer and autumn must be considered by the landscape gardener, if he desires to interpret nature. It should appeal to the poet and the naturalist, who delight to study the varying moods of nature. The delight of a ramble in the country during the winter may be increased greatly by a recognition of the trees with upright trunks and bare branches. It is gratifying to be able to recognize, the specific characters of the trees met with on such a walk, and there are trees which are distinguished at a distance, such as the Lombardy poplar, the birch, the beech, the sycamore and the elm. On nearer approach, others may be noted by their habit of branching and by the appearance of their bark.

Practical Importance.—As this matter is of much practical importance to artists, photographers, designers of landscapes, gardeners, painters and the educated public in general, a more intimate study of the artistic anatomy of trees is given herewith. Trees form especially suitable objects for out-door study and they are available in city and country, in

winter and summer. It is interesting to sit back in a room and study the trees as framed in by the window. The writer with the object of outlining the elements, which enter into the composition of the display exhibits in some of our large museums of natural history, has made sketches of bits of natural landscapes as seen framed by the window. Photographs also accomplish the same purpose, for the photograph is a selected bit of landscape, which more accurately depicts the size and relationship of natural objects better than a pencil drawing ever can do. The successful photographer of nature must be a man with a trained artistic sense.

Deliquescent and Excurrent Stems.—There is a familiar classification of trees into those with deliquescent and excurrent stems. In the deliquescent stem, the tree branches repeatedly, year after year, so that the trunk is soon lost in the branches. The common American elm is a good illustration. The excurrent stems, exemplified in the firs and the spruces of spire-shape, are those which grow upward from a terminal bud, so that there is formed a single uninterrupted shaft. Many coniferous trees are typical of this kind of growth. Another classification is whether the plant is a tree, or a shrub. A shrub is a woody plant with a number of branches of equal strength arising from the same root system close to the ground, while a tree is an arborescent growth with the branches subsidiary to a main stem, if in an undeveloped condition, as a sapling, or possessing a main trunk, or bole, with the branches given off at some distance above the ground.

Deciduous and Evergreen Trees.—A distinction has been made also between deciduous trees and evergreen trees. These are purely relative terms, for we understand by a deciduous tree one which casts off its foliage leaves annually with the approach of the winter, while many evergreen trees are only relatively so, because the leaves are dropped periodically after the lapse of two, three or more years, but usually in such cases the old leaves are not completely lost until new ones have appeared to replace them. The deciduous trees are known also as the broad-leaved trees, because their leaves,

as a rule, are broad and flat. They are known as summer-green trees, because clothed with verdure in summer, and as tropophytes, because alternately leafy and active in summer and leafless and inactive in winter.

Bases of Trees.—In architecture we distinguish the elements which enter into the building. There are the bricks, the plaster, the ornaments, the rafters, the pieces of slate, the tiles, the iron grills and other details which must be combined by the builder into an artistic whole. The botanist recognizes also and has named the parts of the different kinds of trees. The base of the tree trunk may swell out toward the roots, so that an enlarged base is produced. This is typical of trees which grow in swamps with the ground wholly, or partially, covered with water. Enlarged bases may be due to buttresses developed as flying projections and which extend outwardly in all directions as a pedestal rendering the tree more stable. The ceiba (*Eriodendron anfractuosum*) described by Kingsley in his "At Last" is perhaps the best illustration of a tree with a buttressed base, for the inhabitants of the West Indies, where the species is native, use the spaces between the flat extended buttresses as stalls for their horses and cattle. There are two forms of deciduous cypresses in the swampy districts of the southern states. The common cypress (*Taxodium distichum*) has sharp-edged basal ridges, while the other species (*T. imbricarium*), usually found in undrained swamps, has rounded buttresses. Both the ceiba and deciduous cypress are adapted to growth in countries visited by tropical hurricanes, although their buttresses were not developed because of the visitation of such storms, for it was demonstrated a few years ago at the Missouri Botanical Garden in St. Louis that such trees were not injured by tornadoes, while the Eads Bridge and many other trees were damaged badly. Species of the *genus Sterculia* in the East Indies also show buttressed bases, as depicted in the published journals of botanical travellers.

Roots of Trees.—To be considered at this point are the trees which give off a mass of roots which serve to brace, or

prop them with the weight of the foliage and branches above and support them against the mechanical action of the wind. This is noteworthy especially where the trees grow on a steep hill slope for on the lower side the roots have extended themselves in rounded arches in order to give mechanical support. Characteristic examples of this kind of root growth are found along the banks of rivers and turbulent mountain streams where the soil has been carried away in freshets. There are stilt-like trees which are elevated on roots above the surface of the ground. The screw-pines (*Pandanus*) are wonderful illustrations of this kind of root development and so are the red mangrove trees (*Rhizophora mangle*) of the tropical seacoasts. Here the whole system of roots extends outwardly from the base of the tree trunk which is elevated some distance above the salt water, which periodically floods the oozy mud flats on which the flat-topped mangrove trees grow. Many tropical seacoasts, as our Florida Keys, northern Cuba and Central America are fringed with mangrove swamps which are extending gradually seawards, as the impenetrable mass of mangrove roots project in that direction making new soil by catching the mud and floating objects upon which the future mangrove forest grows.

The banyan tree (*Ficus bengalensis*) is an immense spreading tree of India which develops aerial roots from its horizontal branches. These roots descend like hanging ropes finally penetrating the ground. Then they grow thicker with age until they become like pillars. The branches propped in this way are able to grow out horizontally very considerable distances away from the parent trunk. A specimen on the bank of the Nerbuddah in India covers an almost incredible area, which is nearly 2,000 feet. The whole is said to be capable of sheltering 7,000 men. Another fig tree (*Ficus aurea*) is known as the strangling fig. The seeds of this tree fall on the branches of some other forest tree which serves as a nurse. The seeds sprout on the limbs and the roots of the young fig are at first aerial. These aerial roots grow down into the soil in all directions and ultimately completely

envelop the nurse tree, which is strangled to death and finally decays away within the surrounding fig roots until the fig tree is in sole possession of the forest area where its nurse originally stood. The false trunk of the fig shows externally that it consists of many coalesced air roots for there are many projecting, rounded ridges, each corresponding to an original aerial root of the strangling tree.

Palm Trees.—The cylindrical, column-like trunk of palm trees is also a characteristic architectural form. The diameter of a typical palm caudex varies little from its base to its top. This method of growth is determined by the terminal bud, or cabbage, maintaining a constant diameter, so that the stem remains cylindrical in reaching its great height. Some palm stems are so tall and slender in proportion to their thickness that they are appropriately termed flexuous, bending elastically to and fro with the stronger tropical winds. The native Bermuda palmetto (*Sabal Blackburniana*), however, has a terminal bud which under seasonal differences in the rainfall varies its diameter, so that the caudex assumes an hour-glass appearance. Tall trees of this species show a number of superimposed hour-glasses owing to the variation in the width of the stem.

Bottle-like-Stems.—Barrel-like, or bottle-like stems are found in some tropical trees. There is a native of northeast Australia (*Sterculia rupestris*) which has a stem swollen in the middle to the extent of 30 or 40 feet in circumference with a small crown of branches with foliage leaves growing out of the top of the gouty portion, which consists of soft and porous tissue. There are bottle palms (*Colpothrinax Wrightiana*), native of Cuba, which assume the same form of stem. On the Island of Socotra there is a flask-shaped tree (*Dendrosicyos socotrana*).

Tree Bark.—The bark of trees forms one of the elements which must be considered in connection with the impression which the tree conveys to the mind of the artistically inclined student of forest botany. The upright trunk, or bole, is covered with the protective layer of bark which is distinctive

enough in most trees to become of diagnostic importance. There are some variations in the character of the bark of the same species but the initiated soon learns to make allowance for such vagaries usually due to the environmental conditions which were influential when the cork cambium was active in the formation of this protective covering. Bark may be thick or thin; smooth or rough, furrowed or unfurrowed. It may have large plates, or small ones. It peels off in the yellow birch and the paper birch in papery layers. It is shaggy with long bent plates in the shag-bark hickory. The white cedar and California big tree have a shreddy covering, while the beech has a grayish-white tight-fitting bark. The persimmon and dogwood have a bark of square blocks, hence it resembles roughly an alligator skin and this is true of the western juniper (*Juniperus pachyphlaea*) with a prominent form of alligator bark. The shallow furrows in the bark of the western yellow pine (*Pinus ponderosa*) separates it into, reddish, obliquely-placed plates. The eating chestnut (*Castanea*) has long, obliquely-placed fissures. The bark of the buttonwood peels off spontaneously into large plates exposing a whitish, yellowish, or a greenish smooth inner bark. These and the color of bark have an artistic appeal.

Forms Due to Branching.—As branches develop from leaf buds formed in the axils of leaves, the primary branching of stems follows the disposition (phyllotaxy) of leaves which in general is alternate, opposite and whorled. The beeches, chestnuts, oaks exemplify the alternate method, the ashes and maples, the opposite, while the pines and spruces develop whorls of short, lateral branches. It is the character of branch development, the relative growth of the main axis contrasted with that of the lateral branches and the thickness, length and tracery of the finer twigs which determine the forms which the mature trees assume. The whorled branching of the pines, firs, spruces, cypresses, cedars, and other coniferous trees with relatively slow growth of the lateral branches, as contrasted with the rapid growth of the main stem, or leader, produces the steeple-like, or spire-shaped tree.

The cypress tree (*Cupressus sempervirens*), which is a prominent object in Italian and Persian landscapes, is spire-shaped. So are our red cedars (*Juniperus virginiana*), white cedars (*Chamæcyparis thyoides*) of our eastern states and several species of western fir trees (*Abies*) found in the mountainous parts of California, Oregon and Washington. The so-called fastigiate trees, where the lateral branches are bent upward parallel to the main stem, so that the tree is pointed toward the top, suggesting an interrogation mark, are exemplified by the Lombardy poplar, one form of Irish yew (*Taxus baccata* var. *fastigiata*), the fastigiate tulip tree (*Liriodendron tulipifera* var. *fastigiata*) and similar forms of other native and exotic trees utilized by the horticulturist and landscape gardener.

The weeping, or pendulous form of trees is also worthy of mention in the consideration of the artistic anatomy of trees. The reader will at once recall the most typical of these trees, the weeping willow (*Salix babylonica*), a native of China with long, cord-like, drooping branches. There are many other weeping trees, as the weeping birch, beech, mulberry, spruce and the like, to the scientific name of which the varietal name of *pendula* is applied. Such trees should be planted sparingly with due regard to surrounding objects and the placement of them in grounds should be studied carefully and this statement is true for other trees of unusual form.

The method of branching determines the shape of the various kinds of trees. The forms of the pitch-pine (*Pinus rigida*) have been studied by me.[1] The pitch pine, when growing in dense stands in the forest and under stress of competition for light, develops a central axis with all the branches disposed laterally to it, with the lower branches killed by shading, and in many cases broken off, leaving conspicuous stubs. The axis is not always perfectly straight, but may be bent, or inclined, the bending being more or less S-shaped. Other trees are conical. The pitch-pine responds to the advantages of free space and branches more freely until it becomes

[1] *Harshberger, John W.;* The Vegetation of the New Jersey Pine-Barrens, 1916, 53–56.

round-headed. Frequently the stem forks. This bifurcation may be found at the base of the trees, half way up, or near the top. Such trees are V-shaped, or Y-shaped. Another form is that of the candelabrum, when it represents a tree which has developed with several, strong branches in an open space in the woods. Some of the forest patriarchs are of this form. There are trees of other species, than the pitch-pine, which are round-headed (maple), conical as the half-grown Colorado blue spruce, pyramidal (horse-chestnut), columnar, V-shaped, Y-shaped, tuning fork-shaped, where the stem bifurcates but the two leaders bend inwards towards each other near their tops. Some trees are cushion-shaped, basket-like (mountain pine), candelabra-like (dragon-tree), vase-shaped (elm) and umbrella-shaped. The latter form is assumed by a catalpa (*Catalpa bignonioides nana*,) when it receives proper horticultural treatment, and this is the form of the mature stone-pine (*Pinus pinea*) of the Italian landscapes, Such a variety is known in botany as *umbraculifera*. Other new Latin appellations of tree shapes appear in botanical works. Such are *globosa*, *tortuosa*, *pendula*, *prolifera*, *recurva*, *longiramea*, *horizontalis*, *nana*, *prostrata*, *gracilis*, *ericoides*, *pyramidalis*, *cristata*, etc., while if the impression that the foliage gives to the tree is considered, we have such names as *aspera*, *brevifolia*, *barbata*, *aurea*, *glauca*, *semperaurea*, *lutea*, *zebrina* and others found in descriptive manuals. The cauliflower form of tree is exemplified in a species of dragon tree (*Dracaena cinnabari*), and *Euphorbia arbuscula* both found in the Island of Socotra. The vase-shape of tree is seen in the well-grown American elm tree.

Trees at Seashore and on Mountain Tops.—Where trees are subjected to the stress of the weather, as at the seashore and on mountain tops, they assume well-known and characteristic forms which are the result of the impress of the various environmental conditions to which the trees are exposed. At those localities where the pine-barrens approach the sea, as at Spring Lake, New Jersey, or the salt marshes, as at Barnegat Pier and Somers Point, the trees become

reduced in size. Here they become wind-swept and one-sided. One of the usual forms is the bisected tree, where one side fails to develop, owing to the action of the wind and the sand blast in removing the buds on the exposed side of the tree, Another form is the bush, or shrub form (scrub tree), which produces freely a number of clustered stems, more or less wind-blown. At the edge of the pine forest near the sea, low, prostrate wind-swept trees are found their top branches inclined, arched, or lowered in a direction away from that of the prevailing wind. Enos A. Mills describes and illustrates such twisted trees in "The Country Life in America" for January 1920 (pages 58–59). Such trees grow at timber line in the wind-swept regions of the Rocky mountains and other mountains of the world. They are bent, battered and lop-sided. Sometimes where the conditions are unusually severe, they crouch down behind some protecting boulder and spread out horizontally on a level with the top of the boulder. "Many trees thus are standing, worn away to the heart on the storm-ward side, the naked bones showing, while on the leeward there are the green bark and long, outstreaming limbs." Some trees at the seashore and on the mountain tops are prostrate, or cushion-shaped, showing the dwarf habit, or nanism. The twisted trees form the krummholz, elfin wood, dwarf timber, or pucker-bush of the upper mountain slopes near timber line, where it is possible to walk some distance over tops of the trees before slumping through. In the Alps of Switzerland, where cows are pastured, the trees are browsed upon, so that they are eaten away in the middle. The result of such treatment is that the tree becomes urn-shaped, enlarged and spreading at the base, contracted in the center and enlarged at the top. There is thus produced what the Swiss mountaineers call cowbushes. Similar action of cattle in shaping the form of trees is noteworthy in old New England and Long Island pastures, where neglected apple trees become thorny and are browsed upon. The leader and the lower branches have been trimmed back until the tree has assumed a low rounded form which extends in an outward direction

until the cattle can no longer reach the center in biting off the twigs, when a leading stem shoots up and the tree becomes decanter-shaped, or a caraffe-like form, and becomes an altered cowbush.

Topiary Work.—Gardeners can alter the form of some trees at will by the liberal use of the pruning shears in trimming the plants to the required shape. Trees thus lose their individuality and become architectural, or sculptural elements expressing the will of man. This is called topiary work. We have very fine examples of such topiary work in Mr. Hunnewell's grounds at Wellesley, Massachusetts and in England at Levens Hall and Elvaston Castle. There is a portrait at Levens Hall of Mr. Beaumont, "professor of the topiary art" to James II, who constructed the gardens under the direction of Colonel Graham. They seem to have been begun about the year 1701 and have the quaintest charm in the trim and grotesque shapes of the clipped trees, the result of the care and attention of the *topiarius*. "It is an ideal and grotesque world we enter when we tread the pleasure-place of Colonel Graham and of Mr. Beaumont, the gardener who came from France. Fantastic forms rise in yew, strange and remarkable, as far, as the eye can reach, a peacock here, a huge umbrella-like construction there, an archway, a lion and a crown, a helmet bigger than any man could wear, and a host of other such creations, all shaped out of the "ductile yew," except that some of the smaller adornments are in box. A bewildering world of gardening, some may say! We rest in a green arbor, shaped after the fashion of a judge's wig, to wonder what some strange animal or figure can be." "At last," says Mrs. Bagot, in an account she has written of this marvelous pleasance, "I see you pause in bewilderment over some weird contorted figures of box which form a complete circle round a small rose garden. Are they fish, flesh, or fowl? Neither. It is Queen Elizabeth and her maids of honor these quaint bushes are striving to imitate; this one, see, has a ruff and a crown."

Pollarded Trees.—Pollarded trees cut back nearly to the

trunk to stimulate the formation of new branches for fagots used in charcoal production, as in willows, represent a distinct architectural type in some landscapes, Rex Vicat Cole in his "British Trees" (II: 449) writes: "The Pollard Willow has not the same fine branch pattern as the tree in its natural shape, but it sends out long shoots from the stump in curves that are pleasant to the eye, and answers to the breeze with a shimmer of white that plays over the up-turned foliage. Nor are the stools wanting in picturesque qualities. Even when they are split and healing over, they hold to the last to their posts as time-worn guardians of the stream's course; their splintered wood shows pink in the sunlight and festooning brambles and wild roses root themselves in the fissures of the rotten stems. When freshly coppiced the old Pollards stand firmly out of the floodwater, dark forms against a winter sky, gaunt and forlorn."

Branch Tracery.—It is important in studying the artistic anatomy of trees to examine the tracery of the ultimate branches and branchlets in other words to investigate the spray. This can be done best during the winter months when the trees are in the leafless condition. It may be said in general that the mode of growth in the spray corresponds with that of the larger branches. We find in the oak that the spray breaks out at right angles, or nearly so, in a series of long and short shoots, giving an abrupt ramification for which the oak is characteristic and disposed so as to give the spray a flat, horizontal appearance. In the ash the spray runs in a series of irregular parallels, because of the opposite method of branching. The spray of the elm forms a series of acute angles with the parent branch, as the branchlets come off on alternate sides, and the result is a tree which is vase-like in its general form. The tracery of the beech against the sky line is exceptional, as the ultimate branches are divided up again and again into smaller branchlets, so that the tree has an airy gracefulness owing to the repeated subdivision of the branches into finer and finer twigs which seem to blend with the background of the sky, especially, if covered with fleecy clouds, so that with

the gray color of the twigs, the crown of the leafless tree seems to have a hazy, misty, or nebulous appearance.

The Kentucky coffee tree stands at the other extreme, as far, as its ultimate branches are concerned, for the whole branching system is open and the end twigs are stiff and sturdy not terminating in any fine subdivisions, as in the beech. The generic name *Gymnocladus* is expressive of the naked branches without a terminal bud and with very small, lateral buds and destitute of smaller lateral twigs. The birch, when standing alone, has often an outline that is graceful and regular, for its smaller twigs are of a uniform thickness either upright, or weeping. The native dogwood (*Cornus florida*) with its rounded top has a characteristic manner of branching for the ultimate branches are arranged in a cruciate fashion, four branches arising from the same joint and spreading outwardly. Each twig of the cross is terminated by a flat, rounded bud covered with four silvered bud scales, which by growth become ultimately the attractive, white bracts of the flowering period.

The twigs of the horse-chestnut are few and stout without interlacement. The twigs are vertical for they support the broad, compound leaves, and if the larger boughs are drooping, as they sometimes are, they invariably curve upward in a graceful curve at their extremities. The curves are in strong contrast to the sharp angles formed by the twigs. The circumference of the tree is greatest at half its height and this is due to the fact that the central branches spread to the longest distance away from the trunk. The homely charm of an apple orchard appeals to most nature lovers. The topmost boughs of the apple tree grow out horizontally, thus bringing about the flattening of its crown. The branches diverge in a curious zig-zag fashion suggesting a cork screw. Where the forks remain intact, they mark a stage in the gradation from bough to branch and from branch to twig, but where the fork has been mutilated, there is an abrupt change from greater branch to lesser branch. These twists and unexpected angles are conspicuous, because the line of the vigorous new shoot is normally simple and upright.

Leaf-scars and Buds.—Carrying our study of the macroscopic (naked-eye) anatomy of trees to the more intimate details, the examination of which is aided materially by magnification with a hand lens, we take up the investigation of leaf-scars, lenticels and dormant buds. Recently several exhaustive works have appeared on this phase of botanical study. By it one is able to identify shrubs and trees in their leafless and flowerless condition. During the winter months, profitable field excursions can be made to gather and compare the different kinds of buds formed by our cultivated and native trees and shrubs, and if this study is prolonged into the spring months, the bursting of the buds, the development of the leaves and the appearance of the flowers becomes a fascinating investigation. There are a few trees the buds of which have appealed strongly to me. The solitary, or rarely supernumerary buds of the beech are long and taper-pointed covered with light brown scales which have hairy margins. The leaf scars are small and raised, elliptical to semi-circular in outline with narrow, distinct, stipular scars encircling the twigs. The scars left by the vascular bundles are inconspicuous and five or more in number. The buds of the tulip-tree (*Liriodendron tulipifera*) are perhaps the most interesting of any of our native trees. They are flat, dark, reddish-brown in color and covered with a waxy bloom. They are about 5–20 mm. long, oblong and blunt. The outer bud scales are two in number, spoon-shaped and joined by their edges. They represent the transformed stipules of the last foliage leaf of the preceding season developed at the extreme tips of the ripened wood. Beneath these two scales is inclosed a long-stalked smooth, reflexed and folded leaf with its two scale-like stipules which protect the next succeeding leaf and so on until all of the preformed leaves for the new growth have been passed in succession. The leaf-scars are alternate, large, conspicuous, elevated. They are circular in shape with encircling stipular scars. The bundle-scars are small, numerous, and scattered sieve-like over the surface of the scar.

The large, dark, reddish-brown buds of the horse-chestnut

(*Æsculus hippocastanum*) covered with sticky varnish have long attracted attention, especially in their development into leafy branches in the spring. The bud scales are opposite and in four rows and there are about five pairs of these stiff scales to protect the closely folded, palmately compound leaves packed with whitish, cottony hairs, which remain as a wooly covering to the young leaves during the period of their expansion. The opposite leaf-scars are large inversely triangular with 7 large bundle-scars in a single, curved line. The scars left on the twigs by the fall of the bud scales form a clearly marked girdle on the twig and with the large, scattered lenticels are noteworthy structures. The buds of the buttonwood, or plane tree (*Platanus occidentalis*), are like those of the yellow-wood (*Cladrastis tinctoria*) formed and for some time protected by the conical cap-like base of the leaf-stalk, which fits over them during their period of development into buds. When the leaves fall from the tree, the base of the detached petiole leaves a circular scar around the base of the bud. The terminal bud in the buttonwood is absent and the uppermost, lateral bud is large, conical, 5–10 mm. long, smooth and dark reddish-brown. A single bud scale is visible forming a cap to the bud and it incloses a second bud-scale, which is green and gummy, while the innermost scale is covered with long, rusty hairs. The leaf-scars are alternate, generally 2-ranked with conspicuous bundle-scars in a single, curved line.

Associations of Trees.—The description of the artistic anatomy of trees naturally paves the way for a consideration of the association of trees in the forest, in savannas, at the seashore, along streams, in artificial plantations and in smaller groups used for the decoration of home grounds and park landscapes. This is a subject of great interest to the botanist, the plant ecologist, the landscape artist, and the owners of country places. The ecologist and plant geographer are at work upon the problems connected with the natural associations of plants. The fundamental principles of landscape architecture are fairly well known and the practice of the art is receiving greater attention every year.

Before considering examples of landscape design, it is imminent to describe several natural tree associations to show that the studies of the ecologist are important enough to form the foundation for the artistic work of the designer of pleasing landscapes and the artist who depicts on the canvas his impressions of trees, of groups of trees, or of larger associations of natural objects. In the heart of the New Jersey pine-barrens are rolling hills, not dissected by streams, which are separated from each other by large intervals of elevated country sometimes with gravelly, sometimes with sandy soil. The prevailing pine of this region (*Pinus rigida*) forms an even stand, where the trees range in height from 7 to 12 meters (25 to 40 feet). The canopy of this forest is fairly close, although there are intervals where the pine trees are spaced more widely. Associated with the pitch pine occurs the short-leaf pine (*Pinus echinata*), and an under-story, or secondary layer of medium-sized trees of black-jack oak, post oak, black oak, sassafras sprinkled as tolerant species beneath and between the pine trees. The third layer, or story, consists of bear oak, and the dwarf chestnut oak. These are low, rounded bushes, or small trees, with a number of branches rising from a powerful tap-root. Occasionally these oaks close together to form a low thicket from 1 to 1.2 meters. (3 to 4 feet) high beneath the pine trees. As a fourth story, or layer, we find growing the sweet fern, huckleberries, ink berry, sheep laurel, and sumac, while the fifth layer of the forest consists of low, early blueberries along with beard-grass, goat's rue and other plants. The sixth and forest floor layer is characterized by the presence of bearberry, arbutus, wintergreen, pyxie and the reindeer lichen. The ground is well-covered usually by the forest litter of dead leaves and the like, but occasional bare, sandy stretches are found between the pine trees which show as white patches through the serried columns of pine-trees.

Several aspects of this pine forest vegetation may be distinguished. The prevailing overhead color in the winter aspect is the somber green of the pine trees, which meet, as the eye follows the crown into the perspective distance, to form a

continuous mass of dark-green color. The serried columns of the pine trees are of a reddish-brown color, relieved by the oaks, which at various seasons of the year, owing to their deciduous habit, display different colors. The advent of spring brings about a transformation with the blossoming of the herbaceous and the woody plants and the development of the new foliage in various shades of green. Then follow the summer aspects and the autumn with the assumption of the foliage tints characteristic of this time of year. Nothing is dull. The fine weather of the American autumn with bright sunlight, shows the autumn colors to the greatest advantage from an artistic point of view. Nature riots in color.

The following quotation of[1] a description of a Sierra Nevada tree scape is apropos: "When your pack-train first comes out of the manzanita and deer-brush as you enter a Sequoia grove in the California sierras, and you see close at hand the trunks of the "Big trees," you are not so much overpowered by size as perhaps you had expected to be. It is only when you see a man on horseback beside them, or when you compare with them the trunks of the six-foot sugar pines, which elsewhere you had looked on as forest monarchs, that the size of the sequoias begins to dawn upon you. Where these great trees stand close, the ground is free of undergrowth in their shade, but where the sunshine can filter through to the forest floor, there may be groups of smaller trees and shrubs, dwarfed and insignificant in relation to the sequoias but forcing the party to wind about among them with the pack animals, seeking a level open place for a camp. Perhaps it is late afternoon when you reach the little bench or basin in the mountainside where the "Big Trees" are growing, and the sun has already sunk behind a ridge to the west. The trunks of the great yellow pines, sugar pines and Douglas firs, perhaps a hundred feet high and six in diameter, stand in the growing dusk swaying slightly in the evening wind, but above their heads brown, or red-brown trunks immovable as stone towers, the

[1] *Hubbard, Henry Vincent and Kimball, Theodora:* An introduction to the Study of Landscape Design, New York, 1917, pages 66–67.

short heavy gnarled branches and the close-massed foliage of the sequoias, green-gold against the darkening blue of the zenith, still catch the evening light."

The dominant trees of the deciduous forest of eastern North America form a dense canopy and shade the forest floor, so that the secondary trees, shrubs, sapling trees of the dominant class, herbs, etc. must be tolerant of the dense shade. The dominant trees in southeastern Pennsylvania, which region may be taken as illustrative, are tulip tree, chestnut, black walnut, red oak, white oak, scarlet oak, black oak, beech, hickories, hackberry, butternut, persimmon, white elm, white ash, wild black cherry and along the edge of streams the buttonwood, red maple and hornbeam. As we look through this forest, we see the tall, straight trunks of the dominant trees as columns in the forest cathedral with the roof as a canopy of green foliage above through which the sunlight fitfully plays illuminating the forest floor with patches of light. The various vistas between the colonnades of trees suggest the aisles of some vast cathedral and as one gazes upward toward the vault of the blue sky above, the play of sunlight through the leaves of the forest trees of various tints and shades of green and its reflection from the branches and tree trunks in various tones of brown produce a stained-glass window effect, rivalling in beauty and artistic setting the wonderful east windows of Carlisle and York cathedrals in England and the celebrated stained-glass of Rheims Cathedral in France shattered by the explosive action of Hun projectiles. No doubt in the evolution of cathedral architecture the idea of supporting columns and roof arches was derived from the forests of Northern Europe, for the forest groves were man's first temples and were early used for religious rites and ceremonies of various primitive cults. The avenues of royal palms seen in a few tropical botanic gardens, as at Honolulu and Rio Janeiro, perhaps most perfectly produce the colonnade effect, as we see in the porticoes of the Parthenon at Athens and the temples at Karnak and Thebes in Egypt.

Use of Trees in Architecture and Art.—This consideration of the different samples of landscape character will introduce us to the use of trees in architecture and art and will help emphasize the fact that all painters, sculptors and landscape architects must study the details of plants and trees as individuals and in association to become proficient in their respective professions. Theodore Rousseau impresses the observer with the greatness of nature in painting a single tree. Constable painted the real light of the sky upon his leaves and Turner with an intimate acquaintance with trees was unusually successful in such compositions as "Blair Athol" of the Liber Studiorum. Titian, Giorgione, Rubens, Claude, Rembrandt, Poussin, Salvator Rosa, Hobbema, Wilson, Gainsborough, Crome, Girtin, Turner, Cotman, Cox, Corot, Troyon, Daubigny, Monticelli and Lawson, all painted trees in their individual way. Hobbema's "Avenue of Trees in Middelharnis," Holland[1] in the National Gallery in London is a wonderful picture of two rows of trimmed, or lopped, poplars in a Flemish landscape with ditches and flat meadows, or polder. "The Wood Scene, Suffolk" by Gainsborough in the National Gallery in London is a painting of a forest grove in which the lights and shadows of the tree trunks and foliage are portrayed wonderfully. Cecil Lawson's painting called "Marsh Lands" is a beautiful, pastoral scene with cows standing in the water of a slow, moving stream with scattered trees on the hillslope in the foreground of the picture. "Charles I" by Van Dyck shows the king dressed as a cavalier, just emerging from the shade of a forest giant beneath which his attendant stands holding a snow-white charger. The figure of the King appears much more pronounced, because associated with the tree with its leafy branches overhead. The painting of the "Knight of Malta" in the attitude of prayer is suggestive of a sub-tropical scene as in the background are depicted a palm tree (tropical) and a broad-leaved tree (temperate). Corot's "Dance of the Nymphs," pre-

[1] *Coffan, Charles H.:* How to Study Pictures, New York, 1917, page 242.

served in the Louvre, Paris, is a woodland scene breathing the freshness of the morning. He has introduced nymphs and satyrs into his picture in order to enliven the foreground, while the umbrageous trees swell into the leafy canopy above and the background is lighted with the early daylight. The cypress trees in Boecklin's "Isle of the Dead" have the spire-shaped form. The little boat with the departed spirit robed in white is the central subject of the picture and the trees seem to be clustered about the entrance to the abode of the dead which is secluded from vulgar eyes by the dense masses of evergreen cypresses. Among American artists we have many that have produced choice paintings, George Inness has painted for us "Early Moonrise in Florida" where the trees have melted into drowsy shapes and are massed against the moonlit sky, while the moon between the trees sheds its mellow light over the shadowed meadow touching into soft prominence an object here and there. One of the most striking tree paintings is by Homer D. Martin of a row of tall poplars set close together like the outline of a harp, their outline reflected in the water. The picture, which is in the Metropolitan Museum of Art in New York, is known as the "View on the Seine," but more appropriately the author called it "The Harp of the Winds." Another painting by the same artist in the collection[1] of Louis Marshall, Esq. is entitled "The Fire Worshippers." It represents wind-swept trees silhouetted against the golden glory of the evening sky, as if warped by fate they are bending in adoration and supplication before the majesty of the universal. Roy Brown's tree studies have a distinct personality suggesting Rousseau.[2] An unusual study are his "Poplars," which stand out gaunt and lonely in the flat landscape and yet they are wonderful trees. We have brought our study now to the analysis of the paintings of the masters of past and modern times. We

[1] *Coffin, Charles H.:* The Story of American Painting, New York, 1907, pages 208 and 211.

[2] *Bryant, Lorinda Munson:* American Pictures and their Painters, New York, 1917, page 241 and Fig. 190.

must first consider balance in judging a picture. The dignity of the painting depends on balance. A well-poised tree with large limbs and the foliage they carry appears to be balanced without effort The next thing to determine in a painting is its composition, and this is especially necessary, when we have one in which single trees and groups of trees are elements. There should be balance of dark spaces with light, of large and small objects, but we must not overlook the comparison of decided masses with indefinite ones.

There is nothing so difficult in landscape painting as to paint well tree forms against the sky, except the sky itself. With a tree an artist is confronted at every turn with his shortcomings as a painter and craftsman. He must have it lighted by the sky he has painted. He wishes to make it decorative, but fears to convert it into a flat pattern. The so-called edges of the tree give him trouble, so that he must learn how to study edges. The openings between the boughs and foliage must be placed judiciously and their shapes determined. The outlines of the tree should be studied, the lines of the branches and branch curves noted. The student of paintings must study also the variety in light and shade, the variety in color, and the painter in executing his work of art must consider the influence of situation, how the trees are adapted to the situation, the effect of age, the wind, frost, snow and moonlight effect. And now in the further pursuance of this investigation the art student must study the outline forms of trees, and, if possible, determine the structural lines on which such a tree is built. With the study of such matters and the arrangement of branches and buds, we arrive at a consideration of the leaves, their position and character, their form, and texture, leaf mosaic and autumn colorations.

Landscape Art.—Before closing this paper on the artistic anatomy of trees, it is important to describe briefly how trees are used in landscape art, because it is there that the test of the skill of the artist is made, more than in painting, for the man who arranges shrubs, trees and flowering plants for artistic effect must consider the appearance of his landscape as with

time the growth of the plants from youth to maturity gradually alters the original composition. The landscape architect must consider also the seasonal aspects of his plantation, how it will look in spring, summer, autumn and winter and he must lay out his grounds accordingly. When extensive woodlands occur in some places with large expanses of open lawn, the two may not harmonize because the contrast is too violent. To be pleasing to the eye, the lawn and the woods must be so blended that the two grade imperceptibly into each other, and yet, the value of each should not be sacrificed. Again too great an expanse of light, as on a lawn unbroken by shadows, is objectionable, but if too many trees be introduced and wrongly placed the deficiency is at once noticeable. There is a lack of due appreciation of breadth, of light and shade. The beauty of a group of trees does not exist in odd numbers, nor in placing together trees of a great many different kinds in a group. Rather there should be a studied attempt to so plant the trees that the reason for their growth at each particular spot in the plantation is self evident. They must be related to the contour lines of hills and valleys, and disposed with reference to the rivers, lakes, rocks, pathways and roadways, house and out-buildings of a place as to produce a unification of the design. The trees may be planted to produce the beautiful and the picturesque. The trees of a lawn in order to keep their natural shape must be protected against cattle, for soon browsing lines are formed which will efface the beauty of many fine, lawn trees. "Clean, smooth stems, fresh and tender bark under softly rounded, pyramidal, or drooping head, are the characteristics of a beautiful tree." Round-headed trees are appropriate for introduction in highly cultivated scenery. They are not suitable for groups, if used alone. Spire-shaped trees should not be planted in large tracts, or masses, because of the monotony of appearance. Their general expression is spirited when planted singly, or scattered. They produce the most desirable effect among rocks and on very irregular surfaces, and especially on steep, rocky slopes. They may be used to advantage elsewhere. A tall larch, or

two, or a few spruces rising out of the center of a group, give it life and spirit and add greatly both by contrast of form and color to the force of round-headed trees. Drooping trees, if mixed with other trees lose their individuality. They show to best advantage at the borders of groups, or along the boundaries of plantations. Occasionally, a weeping beech, or a weeping spruce may be placed by itself in the composition. I have in mind a weeping spruce planted on a lawn near the entrance lodge of a fine demesne near Philadelphia, which is placed harmoniously. Examples might be multiplied, but enough has been presented to show a few of the principles upon which landscape architecture is based.

The artistic anatomy of trees should appeal to the large circle of individuals, who are interested in botany, in forestry, in horticulture, in painting, in landscape art and the beautiful in nature. The poem by Joyce Kilmer, who gave his life for his country in the late war, may be quoted in part in conclusion:

I think that I shall never see
A poem lovely as a tree
A tree that may in summer wear,
A nest of robins in her hair.
Poems are made by fools like me,
But only God can make a tree.

RUSSIAN LITERATURE AS A POLITICAL FORCE

By Franklin Edgerton

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Russian literature differs in various respects from the literatures of other countries. Presumably most, if not all, of its distinctive features could be explained in terms of its environment, if we were sufficiently omniscient. Attempts have, in fact, frequently been made to explain these distinctive features on the basis of alleged qualities of the Russian people, or of facts in their history. Often I must say that these attempts at explanation seem to me of very doubtful validity, much as I sympathize with the natural and laudable human tendency to seek explanations for everything, even for such elusive things as literary qualities.

But today I want to speak of one peculiarity of Russian literature which seems to be so obviously related to the conditions of Russian life that the most hardened sceptic could scarcely resist the temptation to explain it in terms of them. This is in fact more than a peculiarity of Russian literature. It is itself a condition of Russian life, an attitude of the Russian people towards literature and towards life. It involves also a theory of esthetics, which differs from those that are most prevalent among us, and which I think would not have gained the popularity it has enjoyed in Russia had it not been for the political and social conditions of the country.

This peculiarity of Russian literature—I mean its political and social aspect—goes back to the eighteenth century, and the theory of esthetics with which it is connected to the early part of the nineteenth. The political and social conditions out of which they sprang were inherited from still earlier times. In spite of the reforms of Peter the Great in

the beginning of the eighteenth century, Russia remained essentially medieval down into the nineteenth, in some particulars one might say into the twentieth. Thus for example the system of serfdom, under which the peasants, that is the great mass of the people, were the personal property of their lords, was not abolished until 1861. Again, the absolute and personal autocracy of the government was not limited in any way until 1905, and the attempt at limitation then made proved abortive; it took the revolution of 1917 to complete the work.

All through this time, however, there have been periodic movements in the direction of modernization. These movements have invariably been due to direct influence from the west. At first they were limited to a few of the members of the upper social circles, the nobility, and the gentry. This was inevitable, because these were the only classes that knew anything about western ideas. The imperial court itself has been by no means always free from such leanings; several of the tsars have been liberal in tendency, at least at the start of their reigns. What usually happened was that the tsar would begin his rule by granting or promising liberal reforms, and would cater to progressive ideas for a few years; then he would become alarmed by something, think things were going too far, and go back into the camp of the reactionaries, whereupon all the old methods would be applied again with redoubled force.

The first case of this sort was no less a personage than the famous Empress Catherine. In her youth she coquetted with the ideas of the French philosophers of the eighteenth century; she herself wrote controversial articles on social and political topics, and even undertook to edit a magazine. The French revolution shocked and frightened her out of all such tendencies. She immediately did her best to stamp out every sign of liberalism in Russia. From this time on it became treasonable, not only to say anything complimentary about the French revolution or its underlying ideas, but to criticize in any way the political or social system of Russia.

If anyone ventured to do this, he was immediately accused of being a defender of the "barbarities" of the French.

Yet in spite of all the court could do, there persisted among the few intellectuals of the time (who were of course all nobles) quite a bit of liberal sentiment and even of sympathy with the French revolution. It could not be openly and frankly acknowledged, especially not in print; Catherine's censorship saw to that. Consequently it took two directions; first, it traveled underground, secretly, from man to man, or from one small group to another; and secondly, it found public but veiled and somewhat indirect expression in bellettristic literature.

The first great example in Russia of literary art doing the work of propaganda is Radishchev's *Journey from St. Petersburg to Moscow*, published in 1790. Externally it is fairly harmless. In form it is modelled on Sterne's *Sentimental Journey*. It professes to be nothing but a narrative of a stage-coach trip from the western to the eastern capital of Russia; the chapters are named after the post-stations on the way. In reality it is a scathing attack on the institutions of the time, especially serfdom with all its attendant barbarities, but also the corruption and incompetency of courts of justice and officials generally, and other things. The realism of the picture is perfect; nothing is set down that was not of everyday occurrence; any traveler might easily have seen in a similar journey all that Radishchev records. That only makes the effect all the more devastating. The censor passed the book, with the stupid innocence of his kind. Well would it have been for the author if the Empress Catherine had been equally dull. She herself wrote a sharp criticism of it; being unable to make any real reply, she simply accused Radishchev of sympathy with French and American radicals (he had been so incautious as to allude in the preface to Benjamin Franklin in complimentary terms). After this her judges could scarcely do less than condemn the author to death. This sentence was commuted to exile at hard labor in Siberia, whither he was transported in chains, to be released only in

1801 by Alexander I. His book was banned forever; as long as tsardom lasted it was forbidden to be printed or circulated in Russia, except that in 1888 special permission was granted for an edition of one hundred copies for private distribution to "safe" persons only.[1] For a long time it was forbidden to mention the very name of Radischchev, even to speak ill of him.

As Radíshchev was the spiritual father of tendentious literature in Russia, so Catherine's treatment of him typifies the usual attitude of the government towards this movement. Down to the very end of tsardom the government's theory always was that all would be well in Russia if only it could stamp out the small band of "agitators" who were stirring up discontent. It declared that the great mass of the people were content with things as they were. And this was in general true; at least, the great mass of the people had no idea of rising against the government. In fact, they had few ideas of any sort until very recent times; little opportunity was given them for acquiring any. It never occurred to them, until it was suggested by the "agitators," that the system under which they lived was anything but natural and inevitable. In that sense they were "content." And to keep them so, the government among other things did all that it dared do by open and secret means to discourage general education, and to control very strictly such educational media as it could not eliminate. Universities were hampered to such an extent that at times even their governmentally-appointed officials threw up their hands in disgust and resigned. For a long time such dangerous subjects as political science and economics could not be taught in them; nay, at one time, and that in the middle of the nineteenth century, even philosophy was considered too unsafe a subject, and instruction in it was ordered abolished at Moscow. And the number and size of the universities were deliberately restricted, on the theory that education should be only for a few "leaders"

[1] It was reprinted freely outside of Russia—once by Herzen in London, 1858, and again at Leipzig in 1876.

of the people; it was undesirable that the sons of the "masses" should be educated. For this same reason even elementary schools were not encouraged, and at times were actually forbidden in certain regions. As to freedom of speech and expression, no pretense was ever made of permitting it. At one time, under Nicholas I, it was forbidden to refer in print to any action of the government in any way—even to praise it. In the fifties of the last century the censor suspended the profoundly learned and profoundly dull Publications of the Moscow Historical Society because of a reprint of a sketch of Russia in 1590, by an English traveler of that time, Fletcher. About the same time permission was refused to print an ardently Slavophile study of conditions in primitive Russia, because, in the words of the minister, "it assumes democratic principles for ancient Russia, and our people must be protected against the spread of such foreign doctrines." These last words give the keynote to the theory of the censorship on literature and speech. The government conceived its duty to lie in "protecting" the great mass of good and virtuous citizens against the pernicious propaganda of insidious agitators, imbued with radical notions from abroad, who were seeking to stir them up against the institutions of their forefathers. Such statements abound in the censor's records.

With the enormous spread of direct and increasingly revolutionary propaganda by underground methods, which was one immediate result of this policy, we are not now especially concerned. What does concern us is the turn given to belletristic literature. In spite of the example of Radíshchev's fate, the advocates of reform began more and more to imitate him, giving expression to their ideals and aspirations in the form of fiction and poetry. Experience taught them caution, and they gradually worked out a kind of technique by which they sought, with varying success, to evade the censor and the prosecutor. Their language was veiled; their ideas were implied rather than expressed; but he who had ears could hear them. And since such ideas could not be expressed openly, it gradually came about that those who sympathized

with them looked more and more to literature for their expression. The political and social propagandist, being denied other outlets for his thoughts, took to literature; and consequently literature became the recognized medium for political and social propaganda.

The next step was that serious-minded Russians began to expect and demand that literature should have a social and political bearing. A literary man, because of the peculiar conditions just referred to, was expected to be a teacher, a prophet. If he disappointed this expectation, he was guilty of something like treason to humanity. Already in the first quarter of the nineteenth century this demand found expression in a school of literary critics, who boldly set up the esthetic theory that "art for art's sake" is a paltry aim, and that a great writer or poet must also be a great thinker and teacher. A corollary of this is that a literary critic must discuss not only the form of a work of art, but also its meaning, the lessons it teaches, which are fully as important. If it teaches no lesson, contains no ideas, it is of little or no importance, however perfect its literary form; and the critic must point this out. Still more is it to be condemned if it teaches false or unworthy doctrines.

The earliest critics of this school, such as Venevítinov Nadézhdin, and Polevói, were admirers of the romanticism of Byron and more particularly of Victor Hugo. These writers were to some extent paralleled in Russia by the romantic poet Púshkin and his school. But Púshkin in his later period became involved in the life of society and the court, and his poetry lost touch with the problems of real life; consequently he was fiercely attacked by Polevói and Nadézhdin, who called him a poet of "wine and women." The spirit of the crusader was so strong in Polevói that he condemned even the realistic works of Gógol for the lack of inspiring ideas which he found in them.

A more solid foundation for the practical theory of esthetics was furnished by realism, which since the time of Gógol has been the dominant note of Russian literature.

Gógol's *Dead Souls* is the classic portrayal of all the tragi-comic aspects of ordinary Russian life in the days of serfdom; it is all the more deadly because so objectively done, without bitterness and without exaggeration. Its effect was sensational. Everyone considered it a most telling indictment of serfdom. Its second part, which the Government would not allow to be published, was copied and recopied countless times in manuscript by the enthusiastic youth of the day. It was shortly followed by Turgéniev's *Sportsman's Sketches*, a series of wonderful genre-pictures of peasant life. The young emperor Alexander II, who abolished serfdom in 1861, testified that he himself was greatly influenced towards taking this step by the *Sportsman's Sketches*. These two books probably had more influence in bringing about the liberation of the serfs than any quantity of propagandist arguments or prophetic appeals could have had, if the censor had permitted them.

It is easy to see how literary realism in the Russia of this period necessarily appealed to radical thought. The strongest conservative, nowadays, would hardly deny that anything like a truthful picture of life at that time would have to be done in dark colors. To tell the truth about life as it was then and there was to imply the need for change. The art of Gógol made this once for all clear to the radical critics of the day. They abandoned outworn romanticism and took up the standard of realism. Henceforth truth was the one thing they demanded of a writer; truth to life, genuine, pitiless reality. They were not indifferent to literary form; but they paid more attention to analyzing the realities underlying the work of literary art which they were discussing. And the chief criterion by which they valued literature was the extent of its correspondence to those realities.

The protagonist in this new movement was Bielinsky (1810–1848), one of the greatest names in Russian literature. His fame rests, however, not on his own literary works, but on his critical writings. He was the greatest literary critic Russia has ever produced; but he was much more than that.

His periodic reviews of current literature were in reality essays on political and social subjects. In speaking of a new book or poem, Bielinsky would ask what the author's attitude was towards the problems of real life. If no particular attitude was shown, Bielinsky had little interest in the work and would pass it by with a perfunctory notice. Otherwise he would either commend or attack it for its attitude towards despotism, serfdom, bureaucracy, obscurantism, the inequality of the sexes, religious bigotry, or what-not; and under the guise of discussing the book he would get in a very searching discussion of the subject, which really interested him much more than the book. Naturally he could not carry on this sort of thing indefinitely in the Russia of that day. Only an early death from tuberculosis saved him from the vengeance of the government. For years after his death his very name was anathema, and could not be mentioned in print; he was publicly referred to as "the author of the letter to Gogol."

Others, however, took up his work. For decades the literary reviews remained the regular vehicles for the discussion of all sorts of political, sociological, philosophical, and even scientific subjects. You must remember that the conditions of public life made it difficult, if not impossible, to discuss such subjects except under this camouflage. To be sure, the famous exile Hérzen published in London his magazine, *The Bell*, which took a very open and radical stand, and which managed to circulate quite extensively even in Russia, in spite of the censor, for a time; Alexander II is said to have been a subscriber. But in Russia the place of general reviews was taken by such nominally literary periodicals as *The Contemporary*, which flourished in the years just preceding the emancipation of the serfs in 1861. It was edited by two of the leading successors of Bielínsky—Chernyshévsky (1828–1889) and Dobroliúbov (1836–1861). Dobroliúbov, a man of great promise, died in the very year of emancipation, thereby escaping the fate of his collaborator Chernyshévsky, who two years later was imprisoned and afterwards exiled to Siberia where he spent most of his life. Before his imprisonment and

the suspension of *The Contemporary*, he had managed to express very fully, in his articles and in several books, his esthetic theories, the gist of which was that art is the handmaid of life. The beautiful *is* the real, the life-like. It is the duty and should be the aim of art to explain and comment upon life, to get at the truth of it. That is likewise the aim of science, says Chernyshévsky, which differs from art only in its method; art depicts, science analyzes and draws logical deductions.

While he was in prison Chernyshévsky wrote a novel entitled *What is to be Done?* This story might be called in a way the *Uncle Tom's Cabin* of Russia; not that it preaches the freeing of the serfs, who were already freed when it was written; but because it is a piece of ardent propaganda, containing little to recommend it artistically, and because of the tremendous influence it exerted upon its generation. Try to imagine *Uncle Tom's Cabin* written by the most distinguished and cultivated literary critic of the age, and you will get an idea of the extent to which practical purposes overshadowed purely artistic considerations in Russia at the time. As a work of art this novel is almost beneath criticism. Its characters are lifeless automata, moving by strings which the author pulls to bring about the desired effects. But it depicts in glowing colors the ideals of the radical youth of the period: cooperative industry on the Fourier plan, equality of the sexes, absolute honesty and frankness in personal relations, and other things, all of which seemed then extremely revolutionary, though they would appear to the Russian "reds" of today very tame bourgeois stuff. Prince Kropótkin says of this book: "No novel of Turgéniev and no writings of Tolstói or any other writer ever had such a wide and deep influence upon Russian society as this novel had." And this statement is amply confirmed by others. As one reads the book today, it is hard to believe it. It has now hardly more than a historic interest. Yet no work of Russian literature is more important or significant as illustrating the point I am considering.

The last of the literary scions of Bielínsky, the line of great Russian literary critics who exerted such a tremendous influence upon public life in Russia, was Písarev (1841–1868). He took over the mantle from Chernyshévsky when the latter was exiled and his publication, *The Contemporary*, was suppressed. He represents perhaps the extreme form of the negation of art for art's sake. Read Turgéniev's *Fathers and Sons*, and you will find in Bazárov a fair picture of what Písarev stood for. Like Bazárov, he had no use for "pure literature," typified by Púshkin, whom Písarev fiercely attacked. He shared Bazárov's interest in natural science; he undertook to interpret Darwinism for the Russian public; and he was a thorough "nihilist" in Turgéniev's sense, rejecting completely the value of traditional authority, and recognizing no standard but rationality.

It is hard for us to realize the role which this series of critics played in Russian life, so remote are its conditions from those to which we are accustomed. Their power was due to the fact that they expressed the feelings and ideals of the thoughtful men and women of their time. It was impossible for Russians in this time of storm and stress to view a work of literary art purely objectively as art. Those who did so, or affected to do so, were suspected, and not always unjustly, of a desire to distract attention from the pressing questions of the day. The storm which raged about Turgéniev's wonderful novel, *Fathers and Sons*, is very instructive in this connection. It is now generally recognized that this story is the greatest work of one of Russia's greatest writers. It certainly dealt with the life of its day, and in a pretty truthful and realistic way; it represented the conflict between the older and the younger generation, and did so on the whole very faithfully; perhaps Paul Petrróvich on the one hand and Bazárov on the other may be slightly exaggerated, but they are both very human figures, and you feel the author's sympathetic understanding of both of them. Moreover we can now see—what Turgéniev himself has assured us—that his sympathies were especially on the side of youth. "I *loved*

Bazárov!" he cries, in reply to his critics who accused him of reactionary distortion of his hero; "but to represent a bribe-taking official on the one hand, and an ideal youth on the other, I decline!" We see now that he was right. Yet he succeeded only in displeasing everybody. The "fathers" called him a "red," or whatever was the equivalent for that term at the time; the "sons" called him a traitor to the cause of enlightenment. And all because he was too great an artist, too much a lover of truth, to represent either side as wholly admirable or wholly villainous. We may pardon him for losing his temper and taking revenge on his native land in his next novel, *Smoke*, a bitter arraignment of the Russian temperament, written in the heat of his resentment over the reception accorded to his masterpiece. It is unjust, and therefore false as a work of art, but it is human.

After what has been said you will understand why Tolstói's esthetic theories, set forth in *What is art?* and other essays, were less startling to Russia than to other countries. Tolstói defined the aims of the artist as consisting in an attempt to communicate to others the feelings which he experiences at the sight of nature or human life. And if the artist is faithful to his duty, he should try to transmit in this way "the highest feelings which humanity has attained;" in other words, art should be "religious;" it should "teach men how to live." There was nothing new in this for Russians; it was merely a restatement of the theories of Bielínsky, Chernyshévsky, and others—theories which had been more or less instinctively held by most educated Russians for a couple of generations, and which derived their strength from the peculiar situation of literary art in Russia, as almost the only vehicle through which the social ideals and aspirations of men were allowed to express themselves. The importance of Tolstói's adherence to this school lay rather in the fact that he was himself a consummate artist—the greatest ever produced in Russia, and surely one of the greatest of the world. He threw all the weight of his artistic prestige and experience on this side of the balance; and the effect of this was indeed sensational, all the more so

because throughout his earlier career Tolstói had not been identified with this school, but had even been claimed by the adherents of "art for art's sake." For there have always been a few literary men who professed the creed of "pure art," though they have not had much influence.

Yet it seems to me that all of Tolstói's writings, from the very first, whatever else they may have been, were certainly not divorced from life and reality. It is true that his conscious profession of utilitarianism in art came late in life; and it seems indeed to be true that he formerly believed, or thought he believed, in art as an abstract end in itself, apart from and above ordinary life. But the peculiar thing about Tolstói the artist is that his work, both early and late, seems to show little relation to Tolstói the theorist. His pictures of life are largely independent of his opinions about life and about art. Whatever he may have meant to do when he put pen to paper, his inspiration was such that he could not but produce a living, vital work, and at the same time a work of the highest art. His creative power seems to work like an uncontrollable force of nature, transcending all theoretical restraints. Who that has read that marvelous prose epic, *War and Peace*, a book which has no parallel in the literature of the world, would say that it lacks connection with real life?[1] Or consider *Anna Karênina*, another work which he wrote before his so-called conversion. Its problems are not political, but they are certainly social, and his treatment of them is not merely artistically perfect, but intellectually stimulating.

In fact, *Anna Karênina* is a greater book intellectually than its author meant it to be; he builded better than he knew. It is the best example of what I should call his unconscious realism. Compare this book as he wrote it with his apparent intentions in regard to it, and you will see that while his preconceived ideas were distorted by his theories, his artistic

[1] Its epilog even gives a picture of the first revolutionary conspiracy in Russia, that of the Decembrists—in veiled language, which is however perfectly plain to any Russian reader. Pierre Bezúkhov represents one of the Decembrist leaders.

workmanship flouts them both and produces, in spite of himself, a story of perfect realistic truth, and one that teaches a very different lesson from the one he meant to teach. The motto of the book, by which the author seemingly intends to suggest its moral, is "Vengeance is mine; I will repay." In other words, the wages of sin is death; Anna sinned, and the Lord visited his vengeance upon her. But does the story tell us that? It seems to me that its lesson is very different, and by no means so simple. Anna's disaster seems to be not her own fault, nor yet Vrónsky's, nor her husband's; it is the fault of a false and hypocritical social system, the same which Tolstói fiercely attacked later on in *The Kreuzer Sonata;* the system which makes marriage a sort of legalized prostitution, and attempts to build a social order on such a foundation. It is, to say the least, hardly complimentary to the Lord to imply his identity with this system.

In his later life Tolstói's ideas became clarified, and the implications of his stories are more nearly in accord with his conscious intentions. In other words, his theories about life tended to approach his observation and analysis of it. But never vice versa; he never distorts truth to make a point for an argument. In Tolstói's stories, as in real life, right and wisdom are never wholly on one side, wrong and folly never wholly on the other. In his purely propagandist writings he can be positive and one-sided enough; he was a man of strong passions and definite ideas. But in his bellettristic writings he could not help showing that life is neither black nor white, but composed of various shades of gray. His all-perceiving eye and his sadly ironical pen spare no one and nothing—least of all himself and his most cherished ideas. Read *Light Shines in the Darkness*, an unfinished work published posthumously, for what might be called his death-bed statement; nowhere in the literature of the world, I think, could you find a more tragic, heart-rending confession of failure on the part of a noble, gifted, and sensitive soul. And on the other hand, his weary, patient, loving sympathy extends to all humanity. *Human* is what all his characters are; men and women, like

you and me. You feel, live, think, and act in each and every one of them; you see that if they are weak, foolish, cruel, it is only because circumstances make them so. He attacks institutions, theories, prejudices, and traditions; but for men and women he has only a comprehending, pitying sympathy. "Forgive them," he seems to say, "for they know not what they do."

Tolstói was a man of genius. He stands by himself in Russian literature, and cannot be regarded as a type. Yet it seems to me not unfair, at the same time, to regard his art as the highest expression of the literary ideal which I have been discussing. The seeker after absolute truth to life, after genuine reality, as demanded by Bielínsky; Chernyshévsky's commentator upon life; the "thoughtful realist" of Pisarev—all find their embodiment in Tolstói, who shows that one certainly can be all of this and at the same time be a consummate artist. Only it might be said in reply that, as I have shown, Tolstói's artistic work seems rather independent of his theories about life, and even at times goes contrary to them. In other words, Tolstói's realism is hardly due to his conscious intellectual theories. And this suggests that in a less great genius such theories might be rather a hindrance than a help in the attainment of artistic truth. Perhaps Bielínsky would reply that this simply means that Tolstói's theories were to that extent wrong, and that he needed to revise them in the light of his own artistic perception of truth. This would introduce the whole question of what constitutes truth and by what means one can arrive at it—a question which I must leave to the philosophers.

In another department of literature, the short story, the sympathetic human realism of Tolstói is paralleled by the work of a younger writer, Chékhov, who in his own domain is as supreme as Tolstói, and who shows the same patient, gently ironical understanding of human nature, with perhaps less direct and conscious attacks on social injustice. In order to approach completeness such a sketch as this would need also to deal with the satirist Saltykóv, whose bitterness excludes

the charity or at least sympathy which characterizes Tolstói and Chékhov; and above all Maxím Górky, the prophet of the proletariat, whose earlier work especially is written in the blood and tears of the dispossessed masses out of which he sprang—but with a new note of conscious strength, of inclination to demand and seize freedom instead of only yearning for it, which made him a favorite with the Marxians of the nineties.

But I must content myself with these illustrations of the positive manifestations of the dominant Russian attitude towards literature. Now before closing I want to refer to a negative aspect of it, which is quite as striking and interesting as any. I mean the effect it has had on the position of the one really great Russian writer whose political and social views ran counter to those of his colleagues—Dostoiévsky, called by his critics the prophet of reaction and obscurantism.

In the first place it should be made clear that Dostoiévsky's work by no means constitutes a denial of the view that literary art must preach a gospel of life. Quite the contrary. No Russian writer has more definitely or stubbornly advocated a gospel of human life than Dostoiévsky in his novels. But he is unique among them (at least among novelists of the first rank) in the kind of gospel he advocates. Where the others preach social and political revolution or at least reform, attack entrenched abuses, and denounce evils in high places, Dostoiévsky believes that human salvation must come through submission, meekness, and long-suffering; through a definite renunciation of interest in the things of this world, and a centering of the attention upon the things of the spirit, the Kingdom of God within us. He believes that these primitive Christian virtues have been maintained in their pristine purity only in Russia, and he finds their embodiment specifically in the Byzantine-Russian Orthodox Church. He thinks Russia has a world-mission to perform, in bringing this true form of Christianity to the entire world. Naturally he loathes the liberal and revolutionary parties, which renounce religion entirely, or at least renounce the orthodox church, and seek to

lead Russians astray along the political and social paths of western Europe. To him they are "demons" (see his novel, *The Demons* or *The Possessed*), who must be cast out and sent headlong down the embankment into the sea; when they have been destroyed, suffering humanity will be restored and will sit at the feet of Jesus, that is of the Holy Synod. His meekness and long-suffering do not extend to these "demons;" rather inconsistently, it would seem, he demands their utter extirpation.

Dostoiévsky is a strange and weird figure, and a pathetic one. Himself banished, after narrowly escaping execution, in his youth, for participation in an alleged revolutionary group, he went through years of suffering at the hands of the government, which left him a confirmed epileptic. One would have thought that after this experience he would be the last to urge reconciliation to the autocracy and its side-partner the orthodox church. All his life he struggled not only with the torments of his disease but with incessant poverty and debt—partly, perhaps, due to his own lack of business ability, but none the less hard to bear for that. It is, as one might expect, the darker and sadder sides of life that are depicted in his novels. Scenes of misery and degradation, physical and mental, are the regular thing in them, especially the earlier ones. His picture of life is capable of being interpreted as a support of the very opposite doctrine from his own. But whatever inferences a reader may draw, there is no doubt of the sincerity with which Dostoiévsky himself drew the inference just described. Upon his mystical, rather fanatical temperament the experiences of his life produced the curious effect of making him believe in Christian resignation as the only hope for man.

No one could fairly accuse him of being actuated by unworthy motives in this; and I do not know that anyone has done so. But the practical tendency of such doctrines was nevertheless evident. With good reason Pobiedonóstsev, Procurator of the Holy Synod and arch-enemy of every reform, said upon Dostoiévsky's death that his loss was irreparable.

Never before had so great a writer arisen in Russia to champion the cause of reaction. And it is certainly not hard to understand why the advanced parties had little use for him, and found it hard to do justice to his literary genius, because of their lack of sympathy with his ideas. It is a fact that his very genuine and extraordinary talent has been often underestimated and neglected in his own land, for this reason. For instance Kropótkin is distinctly, though of course not consciously, unfair to him. The difficulty of properly estimating Dostoiévsky's art is further complicated by the strangeness of the literary form of his work, and by the psychopathic characteristics of many of his heroes. His work appeals to the mystically inclined, more than to the temperaments which we commonly call "normal" or "rational." But it seems to me that the least mystical among us—and I myself am conscious of little tendency to mysticism—ought to recognize in him an elemental power, a quality of genius which you get by immediate perception and intuition, which it is hard to analyze or to describe in words, but which nevertheless holds you and compels your admiration—however much he may violate the accepted canons of literary form. We do not need to accept his mystical doctrine; but if we do not set ourselves resolutely against it, we can hardly help yielding to the magic of his mystical art.

If this remarkable though unconventional genius has failed to receive all the appreciation he deserves in Russia, the explanation is to be sought in those same conditions which I have been attempting to describe, and which I shall now in conclusion briefly summarize. Free and direct expression of opinion was made impossible. Consequently opinion sought indirect and disguised expression in literary art. Literature responded to this call of duty, as it were, and under the banner of realism, devoted itself to a truthful representation of the life of the time; and this, at least in the opinion of nearly all the Russian "intelligentsia," implied the clear suggestion of the need for radical changes. Russian realism thus became a wholly different thing from naturalism à la Zola. This

"thoughtful realism" (to use Písarev's phrase), with its radical leanings, became so much the expected thing in literature, that it was hard for a writer who disappointed the expectation to win adequate recognition; there was more or less the feeling that he was a traitor to his calling.

You see that in my opinion we should look for the true explanation of this Russian peculiarity in antecedent local conditions. I might add that I think this is equally true of other Russian peculiarities, in so far as they really exist outside the imagination of their discoverers. I am not inclined to take much stock in the mystic or other qualities supposed to characterize the "soul of the Slav." The "souls" of Slavs, like the "souls" of other people, are the products of their environment. Change the environment and you change the "soul." If a cosmic Little Buttercup should exchange ten thousand Russian babies with ten thousand American babies in their cradles, I very much doubt whether you could detect the difference twenty-five years later. To put it bluntly, I believe that if all that has ever been written about the "soul of the Slav" were destroyed tomorrow, the world would have lost nothing except perhaps some good imaginative literature. The amount of scientific truth contained in these essays is so small, and so distorted by false emphasis and false inference, that we should be better able really to understand the "soul of the Slav" if all of it had never been written.

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